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ERRATUM.

Vol. 11, No. 4, p. 220, FERRANNINI'S Abstract, line 5, for MORRIS read MARRIS.

TROPICAL DISEASES BUREAU.

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TROPICAL DISEASES BULLETIN.

Vol. 14.]

1919.

[No. 1.

APPLIED HYGIENE IN THE TROPICS.

By COLONEL W. G. KING, C.I.E., I.M.S. (Retired).

REPORTS.

(GILBERT AND ELLICE ISLANDS (1916-17.)

The Report on the Medical Service of the Gilbert and Ellice Islands Colony for 1916-17 (J. G. McNAUGHTON, Senior Medical Officer) shows that the Islanders are threatened by no mean enemies—tuberculosis, syphilis, filariasis and yaws. Tuberculosis exhibits itself chiefly in glandular affections of the neck. Operative treatment of these is fully encouraged by the medical officers concerned no less than 317 such cases having been admitted in the Betio Hospital during the year. Dr. McNaughton points out that failure to early resort to excision in the past, frequently resulted in the subjects developing general tuberculosis with subsequent death. He considers that more phthisis sufferers exist than come to notice, as only 18 were admitted to the Betio Hospital. He finds that "tubercular peritonitis" is still the most fatal form of the disease here. This usually starts in the mesenteric glands, and is not so amenable to treatment as tubercular glands affecting the more superficial glands of the body. [The Senior Medical Officer, unfortunately, affords no information as to modes of spread of this form of tuberculosis. Judged by European experience, without the light of local facts, suspicion would point to bovine tuberculosis—or at least to a food contamination.]

In the treatment of yaws, on failure of supply of salvarsan and its substitutes, "tartar emetic, as recommended by Major Castellani, M.D., was administered with invariably good results." Dr. McNaughton since 1914 has used 1814 injections of salvarsan or its substitutes in syphilis, yaws, and filariasis, "without a single bad result." He insists upon the desirability of using mercurial inunction after the first injection in the case of syphilis.

Filariasis is a feature in public health administration the full menace of which it has not yet been possible for the Senior Medical Officer to gauge, as to complete his survey a group of seven more islands has to be inspected by him. Meanwhile facts as to Funafuti, which possesses a population of 217, point to a possible 100 per cent. infection. The only instance in which a slide did not exhibit filaria was that of a one

day old resident, and this individual " had been kept under a mosquito net from birth." Not only are the human inhabitants thus largely infected, but their domestic comrades the pig, dog and hen have also been proved to be sufferers. In the midst of obvious possibilities of re-infection, it is of course not possible to arrive at a satisfactory verdict, but, so far, Dr. McNaughton's use of galyal injections (20 centigrammes) would seem to afford hopeful results. He states that " for two months after the injection of galyal or other substitute of salvarsan, I find no trace of filariae in the blood. After that time a re-infection can occur, and as practically every mosquito in the Ellice group is a probable carrier, it is pretty certain to occur."

The problem of defeating filariasis (as frequent in the case of malaria) is complicated by agricultural requirements and the food economies of communities. The plantations in which the mosquitoes flourish are described as " pits often several acres in extent dug almost to sea level." In one island, Nanomea, Mr. Smith Rowse, a late District Officer, caused these plantations to be " removed to an islet a mile or two away, with the result that now " no mosquito nets are needed and very few mosquitos are ever seen." But such convenient islets are not always obtainable and, so far, the best available remedy has been put in force by Mr. C. H. Gibson, the District Officer, Funafuti, who is having the gardens sprayed once a week with a mixture of crude oil and petroleum, with the result that mosquitoes are fewer in numbers. [" Pits " are probably not essential to agriculture, whilst the petroleum spray method would require much discrimination and perseverance to secure ultimate victory; there is thus left a problem illustrating the advantage of co-ordination of efforts by the local sanitary, agricultural and engineering authorities.]

DISEASE PREVENTION.

MALARIA.

Anti-malaria zones.

When bad air and not the malevolent mosquito was regarded as the factor in the production of agues, caution dictated that the further inhabited areas were distant from the decomposing organic matter and moisture whence it started the less the "fevers." Practical experience gave some intimation of what should be held to be a safe distance for habitations from such undesirable "pa." factories. Necessarily, the limits had to be considered from an economic point of view, for it was soon apparent that cheap food production in the form of rice was intimately concerned. In 1575, legislation was issued from Milan forbidding rice cultivation within certain distances of inhabited areas, on the twofold ground that the practice was conducive of ill health and that there was a tendency to neglect the cultivation of other grain in its favour. In accordance with sanitary advice on the one hand and popular opposition to restriction on the other, the distance prescribed was variously stated by fresh edicts issued in 1593 and 1668. Under Napoleon, an Act dated the 3rd February, 1809, required irrigation not to be conducted within a zone having a radius from first class Communes and fortified places, of the equivalent of 3 English miles; from second class Communes the distance prescribed was $1\frac{1}{2}$ miles, and from third class, 530 yards. In 1600, the Spanish Government had ruled that measurements were to be from the centre of towns, but the Act passed by Napoleon correctly interpreted requirements, by demanding that the external wall in the case of walled places, and the last house which forms part of the aggregate habitation of these places, should be the points whence measurement should be made (BAIRD SMITH, R.E. "Italian Irrigation").

Still before Ross convicted the mosquito, a Committee, which sat to consider "the necessity of prohibiting canal irrigation within certain limits of the site of the new Cantonment" of Peshawar, advised that, whilst a two mile limit was desirable, they believed "it imperative not only to prohibit all canal irrigation within one mile of the Cantonment pillars, but to take steps for securing the perfect drainage of the space included within this line." On this Committee DEMPSTER served as the Medical Member. The experience on which this Committee founded its advice is quite in accord with modern dictates—reinforced as it now is by measurements of distances of normal flight by the mosquito. Thus, eosin-stained mosquitoes have been traced from their resting to their feeding sites, in one instance for 5,565 feet and 2,800 feet, respectively; in two instances, for 3,245

feet; and, in three instances, for 3,090 feet.* In this case the *A. quadrimaculatus* was the subject of experiment. LE PRINCE states in the case of the *A. albimanus* and *A. tarsimaculata*: "On the Isthmus in two instances where breeding was prolific, they have been known to travel from half a mile to a mile to reach houses" ("Mosquito Control in Panama," p. 51). MALCOLM WATSON ("The Prevention of Malaria in the Federated Malay States," p. 81) also shows that a distance of one mile is protective. In 1861, following the introduction of canal irrigation in its surroundings, the formerly healthy town of Kurnool (Madras Presidency) became highly malarious. In 1880, the writer (W. G. King) secured a zone of one mile radius free of irrigation with markedly efficacious results.

It is of much importance that the question of distance of flight of various mosquitoes should be systematically ascertained, as in suggesting any form of anti-malarial measures (more especially connected with drainage) advice by sanitarians given to authorities holding the purse strings must be of a definite nature. Hence, the recent experience of officers of the United States Federal Public Health Service, in connection with the eradication of malaria in extra-cantonment zones, is of value. The effort to secure, in the interest of their newly raised army, that conditions favouring malaria within cantonment limits were removed was rapidly attended with success; but it became obvious that unless soldiers were to be perpetually confined within their malaria free camps, visits to areas surrounding these would result in stultifying expenditure and work which anti-malarial measures had necessitated. As noted at p. 165 of this *Bulletin* (Sanitation Number), Vol. 13, No. 3, March 15, 1919, the standard of one mile was adopted with success - "Usually an area of 1 mile wide surrounding the cantonments and the near-by city or village has been kept free from malaria-bearing mosquitoes as well as the city."

Very carefully collected information as to the distance of the flight of anophelos has been reported by C. W. Merz, Special Investigator U.S. Public Health Service (*Public Health Reports*, Dec. 1918, pp. 2156-2169). The use of coisin for identification of mosquitoes was not possible, but the physical conditions were such as to warrant his drawing safe conclusions. His observations were made on the *A. crucians*, with which a swamp 3 miles long and from 200 to 300 yards broad literally swarmed. This swamp was distant 2 miles from the outskirts of an inhabited area (Montgomery, Alabama). He found that:

"When breeding in large numbers, *crucians* will become distributed over an area within approximately seven thousand feet of the source, in numbers sufficient to be of sanitary importance. From seven thousand to nine thousand feet the menace will be questionable, probably depending on circumstances, and at more than nine thousand feet it will be negligible. The latter two conclusions, since they are based on the absence rather than presence of mosquitoes, may be considered reliable in so far as they limit the zone of sanitary importance. The zone may be narrower, but it cannot be much wider than that indicated, except where topographic or other features make the situation essentially different from that under consideration.

"So far as is known, winds had no effect on the distribution in the present case. There were no prevailing winds during the period of observation, and the occasional gusts produced no noticeable effects on distribution." (pp. 2164-2165.)

* This *Bulletin*, Vol. 11, p. 37.

BLACKWATER FEVER.

The following table (Annual Medical and Sanitary Report, Nigeria, 1917, p. 21) shows the number of cases and their mortality from blackwater fever in the Southern Province of Nigeria during the last ten years :—

Blackwater Fever in Europeans.

	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917
Number of cases	57	48	31	34	26	23	26	20	11	19	22
Case Mortality rate per cent.	17.5	16.6	32.2	20.6	30.7	17.4	23.0	25.0	18.2	15.8	50.0

Five cases of Blackwater Fever occurred in natives with 2 deaths.

YELLOW FEVER.

In Nigeria.

In the valley of the river Benue, North Nigeria, there occurred in August and September of 1917, nine cases of yellow fever—three of these were in the persons of officials, and six in non officials. It was ascertained by Dr. Cameron Blair, the Senior Sanitary Officer, and Dr. W. B. JOHNSON, who investigated the incident, that the infection had been carried by land and not by river. The Senior Sanitary Officer makes the following remark on the subject: "Little doubt remains in the mind of the present reporter that, disguised by the Hausa terms *Saura*, or *Shaura*, *Mayemma* or *Bayemma*, yellow fever has existed most probably in epidemic, not endemic form, for an unknown length of time."

In Gungahroil.

"El Telegrafo" of Guayaquil, of April 1, 1919 publishes an official report on the campaign against yellow fever conducted by Dr. CONNOR of the Rockefeller International Yellow Fever Commission. The report is made to the Ecuadorian Minister of the Interior and Public Health by the Guayaquil health authority (Servicio de Sanidad). Dr. CONNOR began his work on the 25th of November 1918. Every assistance was afforded him by the Guayaquil authorities, and the central Government at Quito formally appointed him Sub-Director of Health *ad honorem*, thus constituting him a national official and investing him with the powers legally pertaining to the office. Dr. CONNOR's work may be described as an intensive campaign against the Stegomyia conducted on lines which have become traditional. The following is a summary of the work done during the months December 1918, and January and February 1919 :-

Domiciliary visits	59,824
Inspections of cisterns	38,161
Inspections of other water vessels	170,538
Breeding-places found in cisterns	3,242
" " other vessels	48,727
Court-yards kerosened	4,681
Wells kerosened	3,126
Length of drains treated (metres)	800

* Summarised by Dr. F. S. ARNOLD.

The results of the labours of Dr. CONNOR and his staff are thus stated in the report :—

"An undoubted gradual diminution of yellow fever in Guayaquil is to be noted, thus :—

December 1918	..	..	..	..	88 cases
January 1919	..	..	..	..	85 "
February 1919	..	..	..	..	43 "
March 1st to 22nd	..	..	..	..	17 "

"Since the 23rd of the present month [the report is dated March 29th] no fresh case has been reported. This is a very satisfactory result and one that we may hope will be maintained in view of the campaign in progress, which is being pursued with the same vigour which has characterised it from the beginning."

[The quarantine Branch of the Public Health Department of the Panama Canal has, throughout the period of the war, maintained its former watchfulness against the importation of quarantinable diseases. Certain of the localities under the Governments of South America have proved so remiss in prompt notification of diseases, that special anxiety has been essential in respect of the possible transmission of plague and yellow fever. The insanitary condition of Guayaquil before the war attracted much attention from the United States and, under suggestions offered officially, there seemed hope of reform under the supervision of Surgeon-General GORGAS. Dr. CONNOR's work, however, shows that the Canal authorities are no longer disposed to trust solely to defensive measures, but are taking the practical course of attacking a dangerous potential source of disease. The importance of Guayaquil not only to the United States but to certain parts of the tropics is thus referred to in the Annual Report of the Public Health Department of the Panama Canal, for 1917. (p. 37) :—

"A résumé of the quarantine operations for the year just ended shows that the quarantinable diseases of plague and yellow fever have not materially changed, with particular reference to Central and South American ports. Along the west coast the first part of the year plague conditions were bad, particularly in Guayaquil, with a high mortality rate. An extension of the disease has occurred in Ecuadorean ports north of Guayaquil, which has been made the subject of reports from time to time, and requires very careful consideration from the standpoint of a farther northward extension to Colombian ports, which would make the disease relatively a very short distance from the Canal Zone. So far as we are aware, however, this disease has not made its appearance in Colombian ports up to the present time.

"In Peru and Chile, general plague conditions have shown little variation. The infection is very generally disseminated, and no measures of any special benefit have been carried out for its eradication.

"Yellow fever on the west coast has been more prevalent in Guayaquil, Ecuador, than elsewhere, though the seasonal increase of this disease at that port looked for in the last few months has not been as extensive as expected.

"In Buenaventura, Colombia, toward the latter part of the year a consular representative, who also looks after the matter of fumigating ships, has been stationed, which arrangement will be more satisfactory from the standpoint of shipping between the canal and this port."

DENGUE.

The elaborate experiments by BURTON CLELAND, BURTON BRADLEY, and by W. MACDONALD on the etiology of dengue have already become known; but it is possible that the delay which has occurred in

Australia, as in other parts of the Empire, in the outturn by printed of routine Annual Reports of Public Health Services may have prevented the original details of their work being at general disposal. These are set forth in the Report of the Director General of Public Health, New South Wales, for 1916 (Pub. William Applegate Gullick, Government Printer, Sydney). The conclusions at which the investigators arrived were:

"1. *Stegomyia fasciata* mosquitoes caught in a dengue infected district in the surroundings of cases of the disease, and some of them known to have fed on a dengue patient on the first and second days of his illness, transported to a non-dengue district, reproduced the disease in four out of seven persons on whom biting experiments were conducted.

"2. Blood taken from three of these four cases reproduced the disease when injected into further persons. The blood of one case was not tested.

"3. The incubation period of the four cases was found to be possibly between five and nine and a half days, probably between six and a half and nine and a half days counting from the biting to the definite onset.

"4. No known case of contagion occurred from any of the above four cases.

"5. No evidence was obtained from two cases, one of which was heavily and repeatedly bitten with *Culex fatigans*, that *Culex fatigans* is capable of acting as a transmitter of dengue fever."

They state that for "mosquito cases an incubation period of approximately six to nine and a half days, possibly, of five and a quarter to nine and a half" was observed by them. (p. 198.)

FILARIASIS.

The Report of the Philippine Health Service for 1917 (Director of Health, Dr. J. D. Long) contains (p. 26) an account of an unidentified micro-filaria which is suggestive of its not being conveyed by mosquitoes. It is said to resemble the *F. bancrofti*, "but it appears smaller, is clear and contains less body structure." One case was found in admissions to the Bilibid Prison, 932 of which were nocturnal and 35 both nocturnal and diurnal. 24 of these suffered from hydrocele, on operation the filaria in two cases was discovered in the milky scrotal fluid. Periodical re-examinations for filaria form part of the medical routine surveys; yet not a single new case of filariasis contracted in jail limits was discovered, although the use of mosquito nets provided for the infected was often neglected by the prisoners.

"Furthermore, the persons found positive for filaria were first confined in quarantine for fifteen days where no attempt was made to use mosquito bars, also it was often necessary to place filaria cases in the contagious department where the screening and mosquito bars were very ineffective. . . . It may be stated that if filaria is transmitted by a mosquito, the particular species capable of transmitting it is not present in the vicinity of the Bilibid Prison, for if it were present it would appear that new cases would have occurred in the prison in the four years examination of the prisoners."

TRYPANOSOMIASIS.

Dr. Cameron BLAIR in his Annual Medical and Sanitary Report (Nigeria, 1917, p. 137) records his opinion that sleeping sickness is far more common, especially amongst the less civilized tribes, in Northern Nigeria than statistical information will permit of judgment. During the year, two Europeans and seven natives were treated for

the disease. Assuming that the disease were twice as frequent amongst natives as Europeans (which he considers is an estimate not on a very good basis but still of a cautious character) there would be, at the present time, not less than 16,000 cases amongst the former. He finds that testimony as to the tsetse-fly being capable of activity at night has accumulated, and that the efficacy of "broad cleared roads" as a preventive measure is also evident.

Dr. H. Andrew Foy, in his Report embodied in the same brochure as above indicated (p. 21), gives the following summary of the present condition of circumstances connected with sleeping-sickness :—

"Six cases have been recorded, of these 2 were in Europeans and 4 in natives. Of the 6 cases 5 occurred in the Eastern, i.e., 1 European and 4 natives, the remaining 1 European in the Western Districts. Considering the wide prevalence of *Glossina palpalis* and other species of Tsetse fly the number of cases that come to light are very small."

Dr. W. B. JOHNSON, in the same Report (p. 164), gives the results of blood examinations of mammals at Zungeru and Katagum. He precedes the list by the statement that a post-mortem after a hard day with the rifle is not an easy occupation; this is true, but Dr. Johnson's professional spirit obviously did not succumb to exhausted bodily energies, as shown by the following results secured by him :—

"(a) Trypanosomes.—(N.B.—*G. submorsitans* is common at Zungeru and Katagum, and *G. tachinoides* or *G. palpalis* is also present).

"Number examined—57.

"Animals examined—Roan antelope, 8; greater hartebeest, 2; Senegal hartebeest, 1; reed buck, 6; oribi, 3; duiker, 4; monkey, 2; hare, 6; rock coney 2; fruit bat, 1; warthog, 8; serval cat, 2; kob, 2; red-fronted gazelle, 7; bush buck, 1; jackal, 1; hyena, 1.

"Number showing trypanosomes—2=3.51 per cent.

"Animals in which trypanosomes were found—Roan, 1; bush buck, 1.

"Type of trypanosomes found—*T. vivax* group in each case. (During the period of the above examination two horses became infected with *T. vivax*, and 44 cattle examined at Zungeru showed trypanosomes in 4=9.1 per cent. The examinations were made by an hour's search over one or two stained slides from each animal.")

TSETSE-FLIES ZONES.

At page 142 of the Nigeria Annual Medical and Sanitary Report for 1917, Dr. Cameron BLAIR, in referring to the clearing of areas as a preventive measure, strikes a note of warning as to care in methods :—

"Wholesale clearing everywhere is not wise. Vegetation is closely associated with rainfall; dense forest—there is too little of it in the Northern Provinces—is a most valuable asset as an inducer of rainfall; to aim at deforesting the Southern Section and afforesting the Northern Section would be a somewhat muddled policy; and it is probably better policy to effect the total evacuation of certain bush regions than it is to clear them; for the people concerned can be settled elsewhere and the water emerging from the evacuated region can be utilized with advantage away from the haunts of the fly."

[Whether or not forests induce rain is a question as to which difference of opinion exists, but there is none as to their conservation of rainfall by securing permeability of soil, slow surface flow and protection from floods and denudation of surfaces; hence, Dr. Cameron BLAIR's plea for retention of as much forest in Northern Nigeria as feasible,

having regard to scanty and, at times, precarious rainfall with its threatening of famine by crop failures, is well founded.] Dr. Blair's support of the policy of "clearing" is, however, manifest in his pointing to the useful influence of "broad cleared roads traversing fly-belts"; showing that even so small an area as thus suggested is of value. "Clearing" against the tsetse-flies has been largely pursued in both the East and West of Africa, and much has been written as to the habits of these insects. Possibly, therefore, a collection and comparison of the opinions of officers who have had experience of the results attained in the localities concerned, would secure an authoritative definition of the size essential for a protective zone having regard to the circumstances attending the infection of man and animals. Thus the tendency to contract the area of zones is seen in the following statement by Dr. C. A. WIGGINS, Acting Principal Medical Officer, in the Annual Medical and Sanitary Report of the Uganda Protectorate, for 1917 (p. 13) :—

"In November it was decided to reduce the prohibited area around the Victoria Nyanza, in the Buganda Kingdom only, from a 2 mile zone to 1 mile, and by the end of the year a great part of this was marked out by flags and the new boundary demarcated."*

RELAPSING FEVER.

Venezuela has never been classed as a Sanatorium. In 1918, according to the Annual Report of the United States Public Health Service for that year :—

"There were cases of yellow fever, bubonic plague, and small-pox, in addition to a high rate of morbidity in non-quarantinable diseases. . . . For the first time in history, relapsing fever was found in Venezuela, the bacteriological work being done by a member of the Rockefeller Foundation, who discovered the spirillum of Obermeyer in the blood of a private patient at the Vargas hospital. . . . Leishmaniasis cutanea was also discovered in Venezuela."

TOBACCO AS AN INSECTICIDE.

Confirmed smokers have, from time to time, attempted to add to the well-known virtues of tobacco by claiming for it a general germicide action, with little result—thus forfeiting a welcome to tobacco fumes in domestic life in forbidden areas. Its power as an insecticide is, however, recognized. Dr. Cameron BLAIR, in the Annual Medical and Sanitary Report for Nigeria (1917), describes an effective use of tobacco in native huts, as follows :—

"During the outbreak [malaria] alluded to above, in the Autumn, in the Benue region, a very effective method of dealing with domestic mosquitoes, especially in mud huts with thatched roofs, was practised. The method is to take a large native pot, drill a dozen holes or so of the diameter of a pencil or penholder in the bottom thereof, mount the pot on three stones, line the bottom of the pot with a layer of stones, above the stones make a good fire of charcoal, on the glowing charcoal pile broken up dry native tobacco to within six inches of the brim of the pot, and lastly, put on the top of the tobacco a paper bag full of black native pepper. Of course, before arranging the prepared pots, all the apertures of the hut or room are closed, with the exception of one for the egress of the operator. So soon as the bag of black pepper has been

* This is an uninhabited zone, not one cleared of vegetation.—ED.

deposited, the operator blots out and closes the remaining aperture. In an incredibly short time, not more than ten or fifteen minutes, the room becomes filled with dense dark, pungent smoke. The room must be left alone for twenty-four hours. On opening, and entering it when this becomes possible, the observer finds that all insects—mosquitoes, flies, cockroaches, earwigs, and the like—have fallen on the floor, dead or unconscious. A beating of the outside of the thatch dislodges insects left entangled in the grass.

The floor is then swept and all the sweepings are conducted promptly to a good fire. This method is cheap and effective; the materials are obtainable nearly everywhere; the native takes to it readily, appreciates it and works it easily; and one average native pot of the larger variety will deal quite successfully with about 1,800 cubic feet. The method was devised quite successfully some ten or twelve years ago by an ingenious political officer, then residing in Bornu." (p. 136.)

[The writer is not aware of any evidence on record to show that the addition of pepper to tobacco adds to its insecticidal power. In the method described, the holes in the earthen pot presumably serve to keep up oxygenation of the glowing charcoal. A favourite method with Indians for the ejection of rats and bandicoots, is to invert over the entrance of their burrows an earthen waterpot with narrow mouth, after placing within it a piece of glowing ember or charcoal on straw, on which has been placed a liberal supply of red chilli powder. They then blow through a single hole in the pot, so as to make a current bearing the smoke towards the hole. A highly irritant smoke is thus evolved—proving as disagreeable to these animals as "mustard gas" has in other spheres of life. Lt.-Col. C. E. WILLIAMS, I.M.S. (now Sanitary Commissioner for Burma) when Health Officer, Rangoon, improved upon this native method by adapting (as a plague measure) a tube to a kerosine tin, and forcing the smoke into rat holes by means of a native bellows. He secured satisfactory results.

A virtue of tobacco which is not often recognized is its power to kill snakes, in an astonishingly quick manner. The neck of the snake being held, the mouth is forced open by a stick; convulsions and death quickly follow the dropping of a good pinch of snuff into the mouth. The cobra takes somewhat longer to die than other snakes.]

CHOLERA.

Cholera Carriers.

A. D., writing in the "Medical Supplement to the Daily Review of the Foreign Press," summarizes investigations by Tamezo KABESHIMA (as reported in *Compt. Rend. Soc. de Biol.*, Vol. 81, pp. 616, 618, 687), on the differentiation of typical and atypical cholera vibrios in the following statement:—"The dogmatic teaching of the German school that a vibrio isolated during an epidemic is to be regarded as specific only if it is agglutinable by an immune serum, has been entirely shaken by the experiences of the pre-war epidemics of cholera in Russia and Italy." In a paper embodied in the *Indian Journal of Medical Research* (Vol. 1917-18, p. 85) GREIG arrived at the conclusion—"From the point of view of prevention of cholera, patients harbouring them [atypical vibrios] should not be regarded as being incapable of spreading infection."

In the Report of the Philippine Health Service for 1917 (J. D. LONG, M.D., Director of Health) evidence is afforded that the campaign against cholera which has been making steady progress under his

administration, is being facilitated by various investigations as to the behaviour of the cholera microbe, and that as soon as new principles are substantiated, there is no hesitation in putting them into practice. The Bilbid Prison is provided with a laboratory which deals with material afforded by a population of about 3,000 prisoners, with the advantage of continuous control—impossible with a free population. These investigations are aided by the Bureau of Science, but are locally conducted by trained prisoners under the supervision of a technically skilled official chief (p. 22).

Irrespective of examinations during quarantine, "routine cultures are taken throughout the prison of all those with six or more months residence, one tube every week. . . . Prisoners known to be cholera carriers, together with prisoners known to be carriers of non-agglutinable vibrios, had cultures taken three times a week." Cultures were found best secured after purgation, instead of trusting to anal swabbing. "92 per cent. of all non-agglutinable vibrio carriers were found in these faecal cultures. . . ." Persons positive for cholera vibrios usually repeated in 42 days. . . . One hundred and seventy-two prisoners were found positive carriers of non-agglutinable vibrios, of whom 14, or 8.14 per cent., became positive carriers later. The shortest time for any of these to develop true cholera vibrios was three days, the longest 42 days and the average 20 days.

In the portion (p. 45 *et seq.*) of the Philippine Health Service Report dealing with the City of Manila, Dr. Salvador V. DEL ROSARIO, Chief of Division, states that relying upon observations made by Aldo CASTELLANI he maintained during the year records of "(a) Occurrence of more or less modified types of cholera cases with the atypical 'non-agglutinable' vibrios as the only causative organism. (b) Occurrence in cholera cases of healthy carriers of either 'agglutinable' or 'non-agglutinable' vibrios susceptible of being changed into one another in the same individual and within the same period of observation." In accordance with this endeavour, numerous cases are quoted with their differentiation of vibrios, but the following will convey the chief facts noted: "That as far as the present observations are concerned, the available evidence tends to show that the 'agglutination test' as a hard and fast rule of identification of the cholera vibrio, is not longer tenable, as 'agglutinability' appears to be a property (active or passive) that can be acquired or lost under unknown circumstances. . . . The comparative frequency of change from one type into the other may be grouped as follows: -

In 10 suspected cholera cases:

Agglutinable into non-agglutinable 2 times.

Non-agglutinable into agglutinable 4 times.

In 43 cholera carriers:

Agglutinable into non-agglutinable 25 times.

Non-agglutinable into agglutinable 10 times.

It will be seen that the independent enquiries of Lt.-Col. GRIEG, I.M.S., of Major Aldo CASTELLANI, of Tamezo KABESHIMA and of Dr. Salvador DEL ROSARIO, conducted in different parts of the world, point to the practical conclusion that the non-agglutinable vibrio is no longer a negligible factor in cholera epidemiology.

If to the atypical vibrio is to be assigned potential pathogenetic potentialities, it is probable that a campaign against cholera

must embrace a much larger sphere of activity than under conditions where a single negative quality was held to decide its power for evil. In this connection, it would be well no longer to ignore the work of CUNNINGHAM, who insisted upon the variable character of Koch's comma. There is also an observation by HAFKINE and Prof. W. J. SIMPSON, C.M.G., when Health Officer of Calcutta, which merits investigation as of vast importance in epidemiology in India, where cattle occupy in relation to water supplies a position peculiarly favourable to cholera spread. This is best stated in terms given by the latter authority, in the Report of the Health Officer (Calcutta) for 1894 :—

"Great difficulties have been experienced in Europe and elsewhere in distinguishing one comma supposed to be a cholera comma, from another comma supposed to be saprophytic and non choleraic owing to their great racial variations; the result of this investigation seems to show that in nature there appears to be no water commas except those connected with cholera, varying, as we found them, in their morphological and physiological and biological characters. This investigation again demonstrates the danger of the tanks in relation to cholera and the urgent practical necessity of having them filled in.

Commas in Calcutta do not, however, seem to be confined to tanks and drains. For many years past, I have been struck with the frequent coincidence of the outbreaks of cholera with diarrhoeal disease in cattle, and this led Professor Hafkine and myself to examine cows suffering from diarrhoea in several outbreaks, which we met with in different parts of Calcutta and Howrah, and in these we found commas in the stools of those who were ill, and in the intestines of those that died. We also found commas in the cesspools connected with the cowsheds in which these animals were suffering. As to the exact connection of these commas to cholera in man, there has as yet been no time to determine."

Commas were also found in the intestines of fish—thus anticipating the recent investigation by Tamezo KABESHIMA.*

[The writer fully confirms, as a practical observation, the assertion as to diarrhoea in cattle during the early stage of cholera epidemics. This coincidence is explainable, as believed by lay Indians, by the feeding of cattle on young grass which appears on the breaking of the monsoon; but its possible significance (strengthened by HAFKINE and SIMPSON's bacteriological statements of 1894) has always seemed to him to deserve attention which was denied to it by the agglutination dogma.]

The Epidemiology of Cholera.

To reason from the effect to the cause and, in the doing of it, to be in doubt as to "which is which" is not solely the privilege of the sanitarian; it is shared, occasionally, by even the youngest politician—within the sphere of his speciality. Thus, in the early days of plague it was not difficult to perceive in the tropics a decline of prevalence which could be ascribed to solar influence on the exposed plague microbe—which theory left out of account Entomology; or to perceive in tracts which in one season had been wet a diminution of malaria when dry under solar heat, and to conclude that decomposing organic matter no longer favoured malaria—again Entomology was an omitted factor;

* This *Bulletin* (Sanitation No.), Mar. 15, 1919, Vol 13, No. 3. p. 146.

or to maintain that the advance of cholera, which in a few weeks brought death to thousands in hundreds of miles of territory, was due to an ill-wind that really bore no one any good when, as a factor, that "mighty atom"—the cholera vibrio—was omitted. Indeed, so fully did the wind theory at one time prevail that there resulted a condition of hopelessness in official efforts to stay cholera epidemics. A good example of this is found in the compiler of statistics as to the health of British troops in Malabar, during the period 1829-1838, who reported a death rate of 28 per mille, but states he did not "think it necessary to add cholera deaths in the latter year as an unusual state of atmosphere prevailed." So powerfully did this feeling pervade some minds that the chief sanitary authority of an important country delivered himself of a whole book, in which he attempted to prove that the State could do nothing to prevent cholera. Nevertheless, these theories of the past were formed by men honestly seeking for the truth, but the whole truth was not attainable with the means at disposal; the inclusion by pioneer workers of meteorological influence as an observed factor, in two of the diseases named, has been proved correct by their successors although less direct in its agency than they had anticipated. As to cholera, however, exactly how to place the meteorological factor side by side with the comparatively recent observation of the prolonged period during which the cholera subject may be a "carrier" (for the comparatively short persistence of ten days was recognized many years back) is still to be settled.

Conditions, as now understood, are complicated by local circumstances favouring transmission of the cholera vibrio by well recognized methods to an extent sufficient to cause observers in different areas of administration, within the same country, to favour views which at first sight are not compatible with recorded incidents where these factors of local importance are less evident. Examples of this are found in the Annual Reports for 1917 of the Sanitary Commissioners with Local Governments of India, whose charges are sufficiently large to exhibit marked differences in climate, physical geography and environment of the peoples they deal with. The Sanitary Commissioner for Bombay in referring to the epidemics of 1900, 1906 and 1912 (p. 10) states "in these years the monsoon was abnormal." From the context, it is judged that the contamination of water-supplies in the presence of an unusually heavy rainfall was the great cause of spread. He adds that "year by year the same story is told; late introduction of infection which at first smoulders but finally is fanned into flame by customs which necessitate journeys from place to place"—an allusion to the instrumentality of pilgrim festivals. The Sanitary Commissioner, Bengal (p. 13), after referring to the seasonal character of cholera incidence and to faecal contamination of water supplies, states that, so long as no attempt is made to prevent the latter, "outbreaks of cholera may be counted on as annual events, especially during the dry months when the available supply of drinking water is often limited." On the other hand, he regards the heavy falls of rain during June and October as "of the utmost value in diminishing the prevalence of cholera." The Sanitary Commissioner, United Provinces, (p. 10) acknowledges seasonal incidence of cholera, and, whilst not putting out of consideration other modes of spread, points especially to the evil condition of wells as water-supplies.

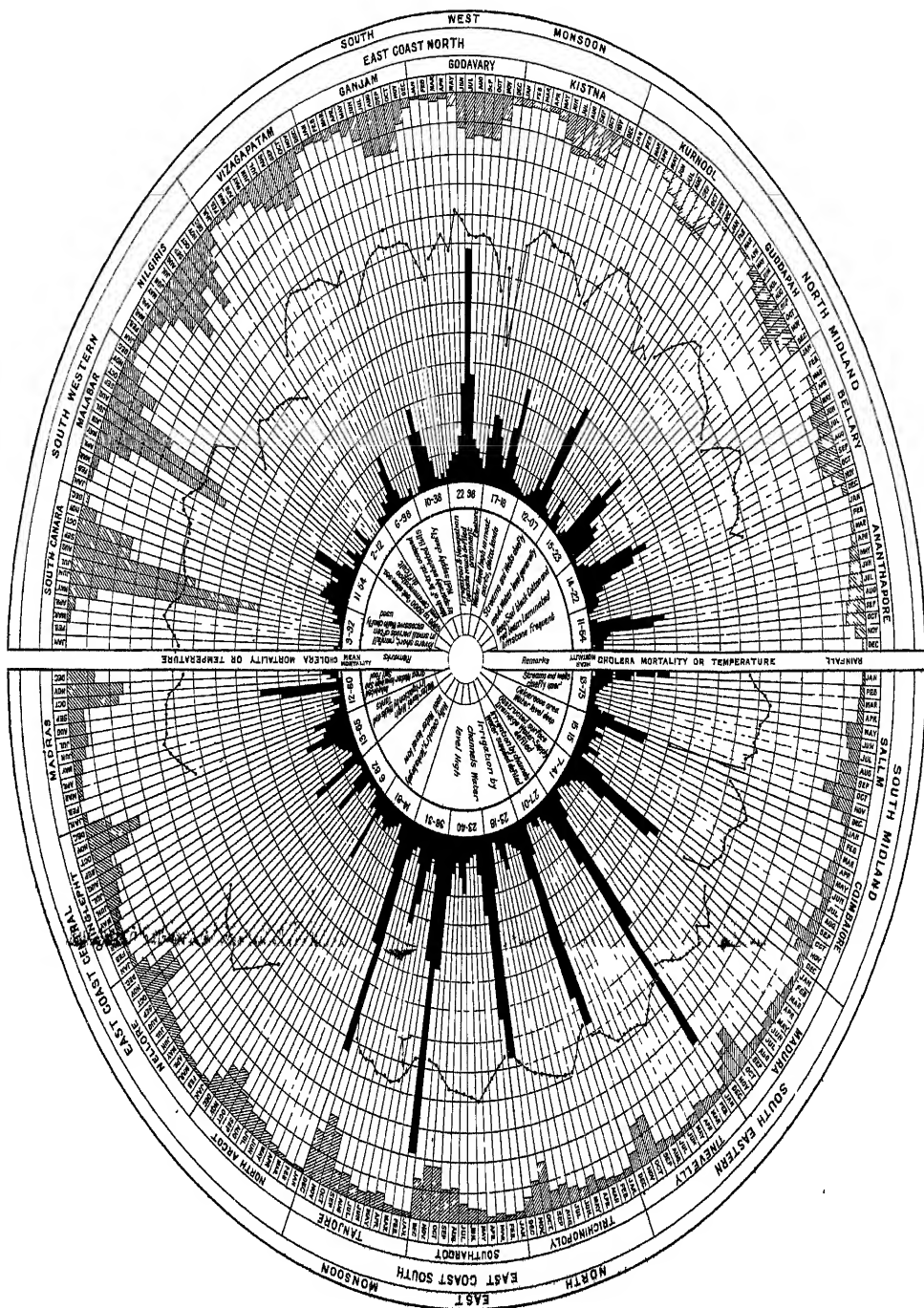
The Sanitary Commissioner, Punjab, considers that "the heavy rains this year raised the subsoil level so high and caused such a large amount of surface flow into the badly constructed and protected wells as to make it extremely difficult to keep these free from contamination." Each of these authorities records months of maximum and minimum prevalence of the disease—differing to an extent sufficing to show how largely the varying climatic conditions within their respective areas influence its epidemiology.

It need not be said that whilst the facts of the case force attention to seasonal prevalence in India as well as in other parts of the world, in the present day bacteriological data guide sanitary action as to cholera and that no wind-borne theory oppresses the officers quoted. Indeed, in the Madras Presidency, records show that the connection between contamination of water by an entity in the stools of the infected was acted upon in 1866 by Asst. Surgeon George BIDIE (subsequently Surgeon-General BIDIE, C.I.E.), and was upheld in theory and practice by successive Sanitary Commissioners—notably by Surgeon-General CORNISH. In 1894, the writer (then Sanitary Commissioner for the Government of Madras) found that the usual official statement as to cholera incidence in that Presidency was that from November to January were the great cholera months. This was correct if the total mortality for the whole Presidency were understood, but analysis showed him that certain districts remained remarkably free during this supposed period of greatest annual prevalence. In a paper read by him at the Indian Medical Congress of 1894, he sought to prove that the incidence of cholera followed definite types according to the geographical position of Districts, in respect to monsoon currents as modified by physiographic features; so that whilst both the N.E. monsoon and the S.W. monsoon affected a District, its chief cholera season would follow its chief monsoon, as shown by the accompanying diagrams. Necessarily, he recognized meteorological influence as of importance solely in so far as it affected the distribution and vitality of the comma bacillus—more especially in respect to water as a medium of spread; although recently more attention has been given to flies as transport agents, they were already regarded in practice as potential local distributors, and the sun as a valuable desiccant. Later observation showed him that if cholera were introduced into a District in other than the period following its chief monsoon*, it would fizzle out.

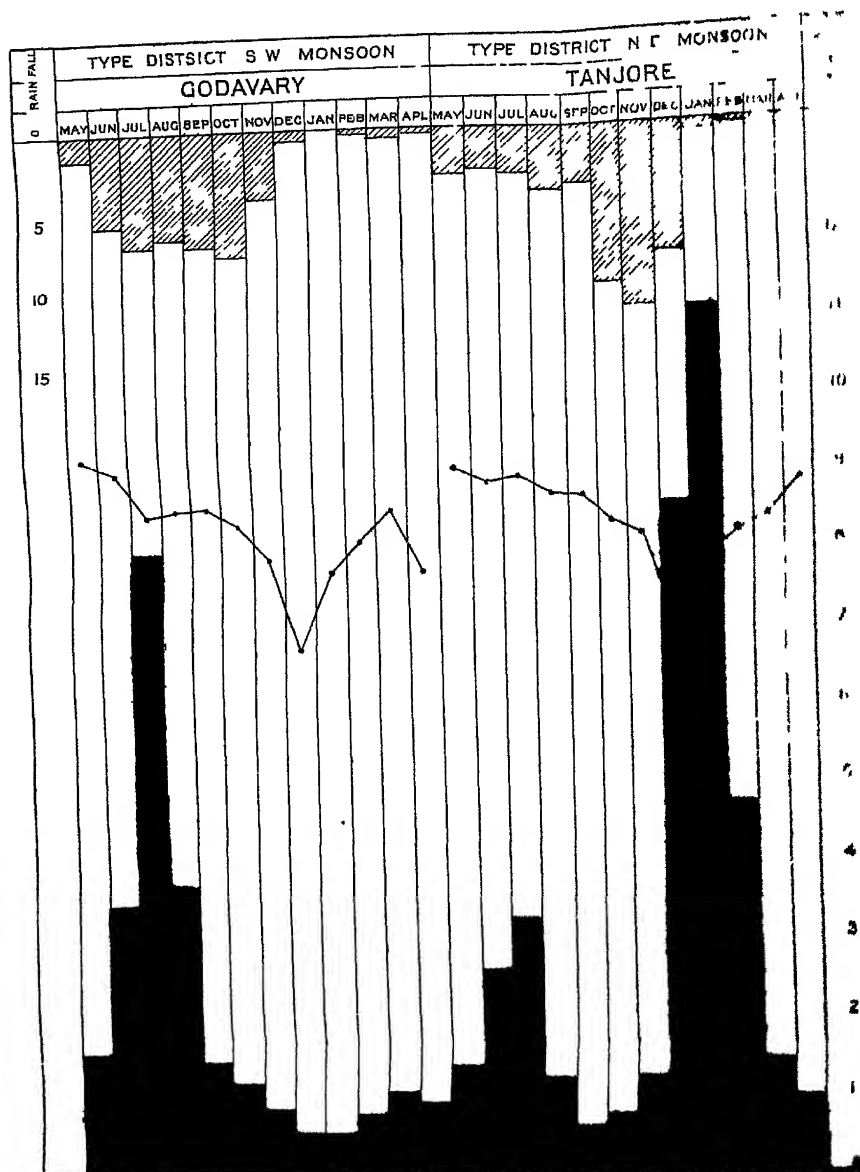
GREG's important investigations on the subject of cholera carriers has led to the practical application of improved means for controlling epidemics by the Philippine Health Service. The search for carriers has been carried out in the most thorough and practical manner by Dr. Salvador V. DEL ROSARIO, in the City of Manila, where he states "the anti-carrier campaign, as is well-known, has been the most successful means of bringing cholera under control in the city of Manila." This method introduces a new enquiry into the epidemiology of the disease, to which is added the difficulty of defining a "carrier" if, as now proved, non-agglutinable vibrios in one stage of existence may be converted into agglutinable, and thus be regarded as answering the true vibrio characteristics. In search of a reply, the Report of that Service for 1916 contains (p. 4) the following statement:—

*This is equally the case with plague but the *duration* of incidence is determined chiefly by the temperature.

MADRAS CHOLERA CLOCK.



SEASONAL INCIDENCE OF MORTALITY FROM CHOLERA IN THE MADRAS PRESIDENCY



REFERENCE

RAINFALL IN INCHES.....*hatched*
 CHOLERA MORTALITY PER 10,000.....*solid black*
 TEMPERATURE IN DEGREES.....*line with dots*

NOTE In using this diagram the scale should be read as marked

"It has been realized for some time that there is much still to be learned as to why cholera persists in the Philippines, and as to the reasons for its periodical appearance in epidemic form. Considerable valuable information was obtained in this regard during the year, but it is not as yet in sufficiently exact form to put it forth in the form of a definite statement.

"Charts showing barometric pressures, atmospheric temperatures, and humidity as compared to cholera incidence, were prepared with the co-operation and assistance of the Weather Bureau, and are now being studied, there are apparently some related factors to be seen, but so far they are so elusive that nothing definite can be stated as yet, it may be, that there exist additional causative factors which must operate synchronously to product a cholera outbreak, which have not as yet been suspected. The only definite and constant causative factor discovered so far is the constant presence of cholera carriers in the community."

As denoting peculiarities of spread, the following extract from the same Report is noteworthy:—

"A notable epidemiologic feature of the epidemic was that there were about twenty apparently independent foci. The disease appeared as widely separated points, the first cases being in persons who had not recently been in any locality where there was any known opportunity for infection and in a number of instances not even away from the immediate neighbourhood of their own homes. To three of these foci could be traced the infection of about four-fifths of the entire area involved. Two of these had their beginning in June, one, originating, probably in the province of Rizal, then involving Manila and successively Bulacan, Pampanga, Bataan, Zambales, and Cavite extensively, one town in Nueva Ecija and imported cases in Tarlac and Pangasinan where, however, there was no spread."*

Here reference is made to the commencement of the epidemic in June. At p. 1 of the same Report, it is stated "cholera was present throughout the year but assumed only slight proportions until the month of May." In this connection, it will be remembered that the rainy season in the Philippines is from June to September.

The following is compiled by the writer, so as to combine a table showing carriers as demonstrated per month in the Bilibid Prison (p. 45) with that exhibiting monthly incidence of cholera in the free population of Panay and Antique, as given in the Annual Report of the Philippine Health Service for 1917:—

	<i>Cholera Carriers.</i>	<i>Cholera Cases.</i>
January	23	10
February	24	139
March	1	9
April	17	0
May	7	0
June	8	0
July	1	0
August	37	0
September	91	48
October	17	72
November	1	82
December	18	82

There would thus appear some connection between months and not only incidence of cases but also of demonstrations by carriers.

In an official published Report, where it had become necessary to support his deduction that the incidence of the disease obeyed certain laws largely influenced by meteorological conditions and not by chances

*Report of the Philippine Health Service, 1918 (pp. 96-97).

out of the power of human beings to reckon with, the writer stated (Minutes of the Proceedings of the Sanitary Commissioner for Madras, 7th July, 1899. No. 1807.S) that

"so long as Districts... and... occupy their present respective geographical positions and, in consequence, their subsoil and water-supplies are chiefly affected by different monsoons, the greatest incidence of mortality will, in the presence of existing insanitary conditions affording opportunities for the continued vitality and propagation of the cholera microbe, be continued in these respective districts with clock-like regularity."

The following quotation (p. 93) from the Annual Report of the Philippine Health Service for 1917, shows that the same class of facts has now become evident in the epidemiology of cholera in the Philippines :—

"This incidence curve is so typical that the writer [Dr. Paul Clements] has often after its study and consideration of the local conditions and of the efficiency with which the control measures were carried out, predicted the termination of an outbreak in a given locality with the same confidence the physician predicts the return of the temperature to normal in a case of typhoid or pneumonia."

So far, therefore, the following tentative remarks made in lands distant from each other by different observers treating the same disease, at least show the direction in which deduction from events in the present day tends. In his official Report above referred to, the writer stated :—

"I have very rarely seen cholera cases arise in a locality where it was not possible to trace its infection to some previously existing case. It has nevertheless always seemed to me theoretically probable that invasion of this Presidency from the endemic area of Bengal and exacerbation of the virulence of microbes left from last invasion in soil and water, may occur, under certain meteorological and subsoil water conditions, so that invasion and endemic waves overlap; but this being absolutely a theory, I do not pursue it."

Dr. Paul CLEMENTS, dealing independently with the same idea, gives his opinion as follows (p. 93) :—

"The typical incidence curve usually follows the importation of a virulent case into a previously infected locality, while the type of incidence last mentioned is as if there was a previous widespread latent infection, i.e., of carriers, some of which, from causes which we do not yet entirely understand, develop into cases."

These several observations bring within view the crucial point as to monsoon influence, namely, the relative position in epidemiology of vibrios agglutinable and non-agglutinable in the human being and in water.

According to Tamezo KABESHIMA (*Compt. rend. Soc. Biol.*, 1918, Vol. 81, p. 616), Lt.-Col. GREIG, I.M.S., (*Indian Jl. Medical Research*, Vol. 1917-18, p. 85), and Dr. Salvador V. DEL ROSARIO (Annual Report Philippine Health Service, 1917, p. 48) non-agglutinable vibrios are not negligible as to exhibiting the true pathogenic properties of the cholera vibrio. This being so the writer would fall back upon the finding of TRENNMANN (*Centralbl. f. Bakt.*, 1893. Abt. 1. Vol. 13. No. 10) as to the enabling of the cholera vibrio to obtain the upper hand* in the

* *Centralbl. f. Bakt.*, 1895. Abt. 1. Vol. 17. pp. 77, 118, 119; ABEL, CLAUSSEN and KARLINSKI.

midst of competing microbes by addition to drinking water of various salts—sodic nitrate, nitrite, chloride, carbonate, phosphate and potassic nitrate. If, for example, TRENMANN is right, it would seem to the writer a reasonable hypothesis that the sudden cessation of demonstration by periodic cholera bearers in certain months in the Bilibid Prison and of epidemic cholera in the free population, as shown in the above table, could be brought about by alteration of constituents of water derived from surface and subsoil* during the early period of a monsoon. Granted that in a locality there existed "carriers" partaking of such water, their intestinal vibrios might well gather virulence as well as those in the water consumed, irrespective of the hitherto harmless faecal contamination of water (in its state insufficiently fitted for special cultivation) becoming now a source of danger. Such instances would bring about a sparse infection within a locality; time and increments of passenger traffic from infected localities would bring the invasion wave—introduced by a vibrio in full vigour by passage through the human being with pathogenic results—and thus an explosive epidemic. The difference in the two waves could be accounted for—especially in areas where shallow well water is used—by the fact that, as a rough average, water under monsoon influence acting upon a soil that has been dried by a preceding hot season *takes about six weeks to effect permeation sufficient to add largely to the subsoil water table*. During this interval, fresh salts of sorts, *plus* dilution by a comparatively microbe free and soil-filtered clean water, have been added to the concentrated and microbe crowded waters of the dry season; the cholera vibrio is thus placed under favourable circumstances at certain seasons for attainment of virulence—becoming temporarily the predominant microbe both when resident in atypical forms in wells and in the intestine of man. Such hypothesis would fit in fairly well with PETTENKOFER's theory *re* Munich.

Cholera Prophylaxis.

Dr. JACOB FAJARDO, Chief of Division, in his Report embodied in that of the Director of the Philippine Health Service, for 1916 (p.120), makes the following remarks as to cholera prophylaxis:—

"At the suggestion of Dr. Heiser, prophylactic cholera vaccine was tried on cholera contacts in Dapitan and Dipolog, and a total of 424 persons were vaccinated, none of whom contracted the disease. It is not intended to assert that this vaccine affords an efficient prophylactic remedy, but it is worth while resorting to where other measures have failed."

The caution with which Dr. Fajardo treats the subject is of course correct, but granting, as is probable, that the contacts and the cholera sufferers had been, previous to inoculation or subsequent to it, subject to the same chances of infection the results have a certain value.

The successful use of ALDO CASTELLANI's tetra-vaccine has recently again brought the subject of HAFKINE's anti-cholera vaccine method into better prominence. Whilst much has been done to preach the virtue of Haffkine's anti-plague vaccine, his anti-cholera vaccine has

*Recent Reports by the Government of India, Agricultural Dept. Research Institute, Pusa, show that marked change in chemical constituents of subsoil water occur at the early period of a monsoon.

received less attention than it merits. This probably is largely due to the fact that the mode of spread of cholera is sufficiently well-known for the sanitarian to be capable of quickly ascertaining the medium of spread and stifling an epidemic. Still, in a country where imperfect or no organization is available to trace cholera epidemics, it is always possible for travellers to undergo a surprise visit from cholera. Here, therefore, and in the case of troops on the march with ever-changing conditions, personal prophylaxis must have an advantageous sphere. There are of course numerous statistical data on record, but one of the most teaching results is thus stated by Haffkine ("Protective Inoculation against Cholera"; Pub., W. Thacker and Co., (Leed Lane. London, 1913):—

"In the Durbhanga Jail, in April 1896, inoculation was applied, similarly, during the progress of an epidemic, but this time one injection only, with vaccine 'II,' in strong doses, was given from the first. The Prisoners had been told to seat themselves on the ground in rows, and every second man or woman, as they happened to have placed themselves, was inoculated. After the time of inoculation the epidemic lasted only 5 days, but was of exceptional fatality. There occurred, among an average daily strength of 90 non-inoculated prisoners, 11 cases (11·11 per cent.), *all fatal*; and among an average daily strength of 110 inoculated, 5 cases (4·55 per cent.) with 3 deaths (2·73 per cent.) (*Vide* Surgeon-Captain E. Harold Brown, I.M.S., Civil Surgeon and Superintendent of Jail, Durbhanga, 'Cholera and its treatment by preventive inoculation in the Durbhanga Jail,' *Indian Medical Gazette*, July, 1896)

"Few operations which I made within the walls of a laboratory exceeded in precision the one just described. Its results confirmed some essential conclusions which I had deducted from previous observations (*vide* p. 75); and I henceforth accepted those conclusions confidently as a guidance for my future work" (p. 69)

ENTERIC FEVERS.

Typhoid Carriers.

The sanitarian having found a "typhoid carrier," after possibly a prolonged and arduous hunt, would be glad to have at his disposal something wherewith to disinfect so undesirable a factor in communal hygiene. Hence an attempt is recorded by BURTON BRADLEY (Public Health Service, New South Wales) to find a therapeutic measure. The patient had been a carrier for seven years. Calomel, liq. hyd. perchlor., quin. sulph. with acid. sulph. dil., betanaphthol and bismuth salicylate, lactic acid bacilli (sour milk) and hexamin were severally tried—without securing the disinfection hoped for.

(Report of the Director-General of Public Health, New South Wales, 1916, p. 178.)

Typhoid and Salad.

The Municipality of Jolo, Philippine Islands, contains 8,000 inhabitants. Between April 12, 1916, and June 11, 1917, 28 cases of typhoid occurred. Each of these cases was bacteriologically confirmed. The epidemiology being obscure, Dr. JACOB FAJARDO, Chief of Division, determined to so classify all possible causes as to ascertain their correlation with individual cases. He therefore divided his Report into the following parts:—"Epidemiological data; classification as to modes of infection; classification into known means of infection; analysis of the local means of transmission applied; and conclusions."

On consideration of the facts so brought together, he formed the opinion that—(1) The origin of the typhoid epidemic in Jolo was the consumption of raw vegetables. (2) Infection of the vegetables came from the use of excrement of typhoid carriers as fertilizer. (3) Seven cases of typhoid contracted the disease from food contamination or finger transmission. (4) Two cases probably contracted the disease through contamination by flies. (5) Two cases became infected through finger contamination by attendants taking care of typhoid cases (6) The cause of infection in one case is undetermined. (7) Fifteen cases of the disease, or 54 per cent. of the total, contracted it through eating uncooked vegetables in the form of salad.

Anti-typhoid Inoculation.

Lt.-Col. P. S. DOANE, before the Sanitary Engineering Section of the American Public Health Association at the Meeting held at Chicago, expressed a truism applicable alike to the British and American soldier. When pushed for thirst, he will let the morrow take care of itself and will drink "any water that is wet." The moral of course is that the sanitary officers concerned must do their best to see that the water at disposal of troops is not only wet, but also bacterially safe. Major G. A. SOPER, of the U.S. Sanitary Corps (in the "Engineering News-Record" of April 3rd, 1919) relates how this tendency amongst American soldiers in France resulted in an undue strain being placed upon the immunity gained by anti-typhoid inoculation. During their stay in camps in America, in the midst of supervised conditions, the absence of typhoid was so remarkable that the men, and possibly to some extent the Medical officers, were thus inspired with an unlimited sense of safety from this disease; and less care in diagnosis was the natural sequel in respect to the all-important first cases of an outbreak. As Major Soper puts it— "these men were protected against ordinary exposure to typhoid, but they were not, and could not, be made proof against the mass attacks of the heavily infected water," which they utilized without approval during the rapid advance in the Argonne. For example, at Nevers, the tap water, the use of which was forbidden except for industrial purposes, caused fifty or sixty cases. Between October 1st, 1918, and February 13, 1919, the mean strength of the American Army was 1,833,000. In that period the typhoid and paratyphoid cases amounted to 1,011, which, considering the total strength and the multiplication of chances of infection owing to numerous insanitary conditions encountered, showed that inoculation, if it did not afford absolute immunity, had an inhibitory influence on the development of epidemics.

TUBERCULOSIS IN ANIMALS.

Dr. H. Andrew Foy (Nigeria; Annual Medical and Sanitary Reports, 1917, p. 26) states that of 54 cattle and pigs brought for slaughter in the Lagos and Ebute-Metta area, 6 per cent. were found to be suffering from tuberculosis.

DYSENTERY.

Dr. A. CONNALL, Director Medical Research Institute, Lagos, reports*

* Annual Medical and Sanitary Reports, Nigeria, 1917, p. 81.
(C585)

the result of examination of three hundred and fifteen samples of faeces; 170 of these were from Europeans and 129 from natives, and 16 from Asiatics. Eleven Europeans were found infected with *Trichuris*. The finding of *Entamoeba histolytica* was frequent.

"In the bulk of such Europeans there was no history of a definite attack of dysentery. Experience points to the entire efficacy of emetine, when properly administered early in an acute attack. The sequence of events in the above cases is usually first an amoebiasis manifested as a diarrhoea, treated by non-specific methods or not at all, and a persistence of the infection in the form of cysts, which may resume the free amoeboid form and give rise to intestinal disturbance or proceed to Liver Abscess. There is probably only one principal mode of transmission of any one Helminthic infection, but the means by which *Entamoeba histolytica* may reach the intestine are probably several, OSLER's three Fs, flies, food and fingers being the most likely, so that prophylaxis is correspondingly more difficult."

SMALL-POX AND VACCINATION.

Mild Small-Pox.

In this *Bulletin* (Sanitation Number), Vol. 13, No 3, March 15th, 1919, reference is made to the mild type of small-pox found in New South Wales, and presumed to be of the same character as that found in Canada, America, etc. So far indications of this disease wherever found point to its rigid adherence to type, but as, undoubtedly, both ordinary small-pox and its derivative vaccine vary in virulence according to conditions under which they are placed, the question whether or not this particular form may exhibit increased virulence under special circumstances, is a matter which necessarily possesses interest for the epidemiologist. If, for example, this disease were launched amongst a people subjected to highly insanitary surroundings or to decreased nutrition it would seem extraordinary that its virulence should undergo no increase. Possibly, such circumstances have not attended its presence in New South Wales; but, in the meantime, Dr. ARMSTRONG,* the Senior Medical Officer of Health for New South Wales, is able to place it on record that "the behaviour of the disease during a period of nearly four years has made it tolerably clear that no increase of virulence is to be reasonably anticipated. The epidemic of small-pox in New South Wales to-day is, as regards virulence and clinical features, unaltered from the type of the disease that was introduced early in the year 1913." He, however, adds that attacks of this form of small-pox are in many cases "very disfiguring," and that it tends to produce abortion in women affected. The Chief Sanitary Inspector (p. 36) places on record both an instance of the mildness of the disease and of the sense of discipline and duty of a member of his staff:—

"At Narrabri, the local sanitary inspector refused to be vaccinated, and as his work included disinfection of infected premises, he contracted small-pox. Before going to hospital, however, and while in an infectious state with the rash well developed, he continued to carry out his usual duties in addition to acting as ticket collector at a concert at the Town Hall. . . . Another local resident who contracted small-pox 'escaped from the hospital and visited his friends.' "

* Report of the Director General of Public Health, New South Wales, 1918, p. 108.

Purified Vaccine.

Under the action of glycerine, animal vaccine vesicle pulp parts largely with its mass of extraneous organisms. According to NOGUCHI* at the end of the ripening process, which consumes from one to three months, the virus "usually still contains a certain number of bacteria; bacteria free virus is practically never produced by glycerination." He holds that "of the two most commonly employed chemical agents for the ripening (eliminating bacteria) process of the green pulp, glycerol and phenol, the latter is the less injurious. Phenol in concentration above 2 per cent. destroys the virus within 24 hours at any temperature, but it has almost no injurious effect when used in 0.5† to 1 per cent. On the other hand, glycerol is a powerful vaccinicide." This vaccinicidal power he considers exists even when used in the dilution of 40 per cent., so that, when undergoing ripening, glycerinated vaccine forfeits some of its efficacy. Direct experiments by FREMLIN, on behalf of the Local Government Board (England), have shown that the extraneous organisms found with vaccine, where cultivation and preservation have been conducted with reasonable care, are of no pathogenic importance. The removal of extraneous organisms by any process which also affects the activity of the vaccine is therefore of less interest than contended by some authorities, if it be remembered that the operation of vaccination on the human skin, in spite of vigorous cleansing, cannot fail to be conducted in the midst of extraneous organisms which may at times be numbered by thousands; such organisms on the human skin are practically of the same character as those the "ripening" process is supposed to get rid of from animal vaccine. The inimical action of glycerine upon the activity of the vaccine virus is specially marked at temperatures over 37° C., and, hence, the necessity, when using this mode of preservation of vaccine in tropical climates, of employing cold storage, and exercising special care in preventing exposure to heat during transport.

If, however, it were possible to place on the skin a vaccine really bereft of extraneous organisms, and which, as an accompaniment of its purified condition, exhibited a high grade of activity of its virus an ideal would be attained. This Noguchi's experiments show has been accomplished by him. The following are extracts from his description of his method:—

"A sample of glycerinated virus free from sporogenous bacteria was incubated at 37° C. for two days or longer, in order to destroy practically all the bacteria still present in it. The skin on the dorsal side of a rabbit was shaved, and thoroughly cleansed with soap and rinsed with sterile distilled water. It was again shaved closely, after which the glycerinated virus was applied, in such strength as to produce separate eruptions. The vaccinated surface is protected from contamination by means of a sterile bandage. On the fourth or fifth day the bandage was removed and the surface washed, first with absolute alcohol and then with ether. Several vesicles were selected and each was cleansed with a 5 per cent. lysol solution, and washed alternately with absolute alcohol and ether on sterile gauze. The eruptions were scraped with the edge of a sharp scalpel, and the scrapings emulsified in several centimeters of sterile

* *Journal of Experimental Medicine*, Vol. 21, 1915, and Vol. 27, No. 3, 1918.

† First proposed by KITASATO.

saline solution. The emulsion was mixed with several volumes of ether and shaken in a sealed vessel for varying periods of time at room temperature. Samples were removed at 1, 2, 4, 8, 12, 24, and 48 hours, from each of which cultures were prepared. When spores are absent, sterility is usually obtained in twelve hours. The vaccinal activity falls at times to one-fifth of the original strength, but the characteristic properties remain unaltered.

"The vaccine emulsion so prepared is employed for the intratesticular inoculation of rabbits. Rabbits with well developed testicles should be chosen. After ether anesthesia, an assistant holds the animal and fixes the testicles to prevent their withdrawal into the peritoneal cavity. The scrotal skin which is tightly stretched over the testicle is sterilised with 5 per cent. lysol solution, and then painted with tincture of iodine. The operator next inserts the needle of a sterile syringe containing a 1 to 10 or 1 to 20 dilution of the emulsion into the testicular parenchyma along the long axis. The point of the needle is prevented passing through the parenchyma to the tunica vaginalis. The contents are now gently forced out of the syringe into the organ at different regions, by turning the direction of the needle. About 1 c.c. is injected of emulsion into a testicle weighing from two to three grams. The organ is gently massaged to distribute the virus throughout the entire organ. The operation is practically painless.

"The method just described is employed for the inoculation of the testicular strains of the virus, in which case an emulsion of testicle previously inoculated with the virus is used. The stock emulsion is prepared by grinding up the aseptically removed organs with a sterile 60 per cent. glycerin solution, in the proportion of one gram of tissue to two or three cubic centimeters of the fluid and any dilution of it, about 1 to 10 or 1 to 20 saline is prepared for the purpose of the injection.

"The testing for bacteria in the emulsion is an important point. . . . It is advised to use at least two rabbits for each transfer, because sometimes a rabbit reacts poorly to the vaccinal inoculation of both skin and testicle; but once the virulence has reached a certain height this precaution is no longer necessary. [Possibly ten transfers may be required to secure the desired increase of virus activity, but, having progressed thus far, Noguchi shows that he was able to maintain undiminished virulence through over 60 transfers.] By the fifth day after inoculation, the vaccinal activity seems to attain its maximum height since almost confluent eruptions on the skin of rabbits are yielded in dilutions of 1 to 1,000."

As a result of continued transfers from rabbit to rabbit of testicular vaccine free of all associated extraneous organisms by his methods, Noguchi finds that the activity as tested on the rabbit is so great that confluent eruptions are produced on the shaved skin with a dilution of 1 to 10,000, whereas vaccines of current quality are considered sufficiently active if they produce an almost confluent eruption in a dilution 1 to 500. According to HENSIVALL and CONVENT this may be regarded as a standard of potency, or even a less grade of potency may be accepted, if, in a dilution of 1 to 100, a vaccine will produce a continuous line when used for the vaccination of infants.

Noguchi's method can also be employed with young bulls. He finally claims that not only does his method secure a pure vaccine, but one which is economical having regard to the comparative cost of rabbits and calves, and the fact that the high grade of activity of testicular vaccine virus permits of very great dilution to bring it within the ordinarily employed vaccine standard.

On the subject of preservation, he states:—

"Experiments on the viability and resistance of the testicular strain of vaccine virus indicate that the vaccine virus is best preserved when emulsified with Ringer's solution or 0.9 per cent. saline solution. Distilled water, while apparently one of the best diluents fails to keep the virus as

active as long as Ringer's or saline solution. As would be expected, the lower the temperature is the longer the virus retains its viability. At 18 or 37° C., the deterioration of the virus proceeds rapidly. However, a small part of the virus survives after many weeks standing at 37° C.

Re-vaccination.

The following remark is made in the Report of the Philippine Health Service for 1917, in the Section dealing with the City of Manila (Dr. Salvador V. DEL ROSARIO, Chief of Division), p. 65 :—

"In the annual report for 1916, it was stated that the markedly increasing number of varioloid cases in Manila could well be taken as an indication that the immunization conferred upon the city population over ten years ago* by a thorough and extensive wholesale vaccination was beginning to be lost, and that the epidemiological moment was one which would rather call not only for the vaccination of unprotected people but for re-vaccination of people supposedly protected by vaccination over three years old."

RABIES IN EGYPT.

According to the Annual Report of the Department of Public Health, Egypt, for 1916 (p. 58), there occurred in that year an increase of rabies resulting in 789 patients resorting to the Anti-rabic Institute for treatment. A modification of Pasteur's method was practised by Dr. BABES, the results of which are held to be "very satisfactory."

He saturates the organism with a large quantity of anti-bodies by means of injections of pure anti-rabic serum; the immunity thus created allows the use both of a greater quantity of virus, and of stronger virus, in vaccination. This method would seem of special importance in cases of bites of the head. At the beginning of 1916, therefore, it was decided in such cases to inject at the beginning of the treatment 15 to 20 c.c. of pure serum. Simultaneously, the usual series of vaccinating emulsions are injected into the other side of the abdomen; the injections of vaccine alone are then continued in doses very much greater* than those employed in the usual treatment.

TRANSMISSION OF INFLUENZA.

The U.S. *Public Health Reports* for January 10, 1919, contains a statement of numerous experiments to transmit influenza by the secretions of the upper respiratory passages of patients being injected into the noses of 68 volunteers; both filtered and unfiltered material was employed. In one case, one cubic centimetre of blood taken during the active stage of influenza was inoculated subcutaneously. In all cases no results occurred; 39 of the volunteers "were without history of attack of such illness [influenza] during their lives." In other cases, an attempt was made to transmit influenza by putting the volunteer in such proximity to the patient as might occur in intimate conversation. Here also negative results attended the experiments. The data thus collected are regarded as of interest by the authorities concerned, but are not quoted as proving anything definite. In the *Public Health Reports* of December 20, 1918, it is stated that at the American Public Health Association Meeting, Health Officers from all over the country and from Canada, Mexico

* The epidemic in Gloucester of 1896 (when 2008 attacks occurred) is recorded as having taken place after compulsory vaccination had been suspended for ten years.—*Lancet*, 1896. Aug. 22, p. 542.

and Cuba exchanged experience. "Considerable evidence was adduced which showed that apparently not quite enough attention had been paid to soiled fingers in the spread of the disease. The same is true of infection spread through soiled eating and drinking utensils." The evidence as to Army camps went to show "that the disease had been less prevalent in those camps where sterilization of eating utensils was insisted upon than where this was not done."*

CATS AS "CARRIERS."

According to Dr. Noiman WALKER ("Introduction to Dermatology") the cat acquires favus "from the mouse, and one could regard with equanimity this illustration of retributive justice, were it not that the cat often carries the disease on to the children of the household." He adds that in the mouse the disease is at times fatal, the pressure effects of the scutula being so great that the bones of the skull are eroded and the animal dies. According to the U.S. *Public Health Reports* for February 21, 1919, it has seemed probable that cases of favus in certain persons connected with resacking, the mending of bags and the like of wheat imported from Australia have been caused by contamination by mice suffering from the disease in that country. The appearance of such cases, however, has not been considered as of sufficient importance to "warrant any interference with, certainly not to warrant the exclusion of this grain."

Whilst descriptions and figures presented by Australian physicians leave no question that the disease present in Australia is favus, samples of wheat and of several mouse skins collected in Australia and studied at the Hygienic Laboratory of the U.S. Public Health Service were found negative. It is held that mouse favus that may be conveyed to man is caused by the fungus *Achorion quinckeum*, whereas the typical favus of the human being is caused by the *Achorion Schönleini*.

Food.

Vitamines.

The U.S. Public Health Service Annual Report for 1918 refers to an important investigation made under official auspices, which must be regarded as affording definite results concerning a matter on which much difference of opinion has existed. It was found (p. 62) that "under ordinary conditions beef does not lose any of its vitamin contents when heated for three hours at 120° C." Facts as to milk have not yet been completely worked out, but, "so far, it is possible to state that milk treated for three hours in an autoclave does not lose a considerable part of the accessory foods (vitamines). The "ordinary conditions" referred to concerning beef are further defined in a summary of experiments in the *Public Health Reports* of January 3rd, 1919, as "without the previous addition of alkali" e.g., sodium carbonate. Under such conditions, "a temperature of 120° C. does not destroy completely the anti-neuritic power of this food, and therefore does not lessen its food value in this respect."

*In the Scotter epidemic referred to in this *Bulletin* (Sanitation Number, March 15, 1919, p. 160) mice feeding experiments were successful. (Annual Report of the Medical Officer Local Government Board, 1890, p. 95).

Reconstructed Milk.

Synthetic milk is possibly not contemplated either in the laboratory or market, its reconstruction is, however, now declared to have been satisfactorily accomplished. The Annual Report Public Health Service of the United States for 1918 has (p. 64) the following note on the subject. —

"It has been found entirely feasible upon a small scale to prepare a milk of satisfactory physical characteristics and of most excellent sanitary quality from dry skim milk powder, butter fat, and water. Although the process as a whole has not hitherto been carried out upon a large scale in the preparation of a market milk, yet both the homogenizing of butter fat for the preparation of cream and the use of dry milk powder have become established practices. There remains, therefore, only the demonstration of the practicability of preparing market milk in this way, and in view of the great difficulties in the way of securing a proper milk supply for Nitro, the situation seemed especially favorable for making this demonstration. The study thus far has entailed several trips of inspection to milk powder plants and a considerable amount of work in preparing specifications for mechanical equipment. The machinery has now all been ordered and is being installed."

Detection of Condensed Milk as an Adulteration.

F. WEEHUIZEEN in *Mededeelingen uit het Geneeskundig Laboratorium te Weltevreden* for 1918 (p. 161), furnishes a method of ascertaining the presence of condensed milk as an adulteration of ordinary milk, which may prove useful:—

"Selwanoff's reaction as applied for years, however, has no rational basis. Furthermore, the process of boiling for the reaction tends to decompose the aldohexoses (glucose and galactose).

"I was able to avoid both objectionable factors, viz., 1st, the presence of water and, 2nd, the heating process, by dissolving hydrochloric acid gas in alcohol.

"The simplest way of preparing this solution is to drop strong hydrochloric acid (sp. gr. 1.19 about 35 per cent.) on strong sulphuric acid, and to collect the gas that is formed in a small bottle containing absolute alcohol cooled in ice. By continually turning the bottle, saturation and constant cool temperature are attained. If the temperature rises too quickly, the supply of gas must be suspended for a little while.

"The alcohol must be completely saturated. This can easily be tested by taking the bottle out on the ice for a while and blowing gently against the brim: the liquid will then 'smoke.' This reagent must not be kept for any length of time.

"If to a solution of sugar containing ketohexoses as such, or in the form of disaccharides (e.g., cane sugar), 50 to 100 mgr. of resorcline and then a few c.c. of alcoholised hydrochloric acid are added, the mixture colours dark red rapidly at the normal temperature. But if the solution contains lactose only, it will not colour.

"Should saccharose and lactose in solution be present—and this is the case when the adulterant is condensed milk—the water must of course be removed as completely as possible. This is fairly easy.

"Proceed as follows: to 10 cc. of milk add 20 cc. of absolute alcohol, shake the mixture and defecate immediately and thoroughly by filtration. Evaporate the liquid of 10 cc. of the filtrate in a water bath (the rest need not be quite dry), let the remainder cool properly, add about 50 mgr. of resorcline and 3 or 4 cc. alcoholized hydrochloric acid, and stir well with a glass rod. If only one or 2 per cent. of milk sweetened with sugar is present, the mixture will colour a light or dark cherry-red within 3 minutes. If the colouring does not take place within that time, one may conclude that there has been no adulteration with saccharose. One would think that it is practically simpler to taste the milk and to acknowledge that this is an indication, but it is not a proof; I have had cases of milk that had a sweet taste, but in which no cane sugar could be traced."

Milk Constituents.

In a paper contained in the *China Medical Journal* of November, 1918, C. O. LEVINE, B.S., Instructor in Animal Husbandry and Dr. W. W. CADBURY, College Physician, Canton, give data as to fat production in milks of local buffaloes, which much exceed ordinary analytical results. The average fat from the analysis of milk of thirty buffalo cows in and near Canton yielded 12.60 per cent. Not less remarkable is the fact that there exists a local breed of ordinary cow—the so called native “yellow cow”—capable of yielding 8 per cent. of fat. They afford the following contrasts :-

	Canton Buffalo milk per cent.	European cow's milk in Canton, per cent.	European milk in America, per cent.
Fat	12.60	3.80	3.69
Proteids	6.04	3.23	3.53
Sugar	3.70	5.96	4.84
Ash . . . . .	.86	.81	.73
Total Solids (including the fat, ash, proteids. and sugar)	23.20	13.80	12.83
Water	76.80	86.20	87.17

Cocoanut Oil.

Cocoanut oil on the Malabar coast is evident not only in culinary operations but also as a necessary adjunct of the toilette of the hair and skin of several millions of Indians. With the Javanese, at least in culinary arrangements, it would seem to occupy an equally important place. Believing that whilst the fat-soluble vitamines value of other substances had been studied in America, cocoanut oil had not yet attracted attention, Dr. B. C. P. JANSEN, in 1917, considered it a matter of special local interest that an investigation as to cocoanut oil characteristics should be undertaken. He accordingly made a large number of experiments at the Weltevreden Laboratory.* He used the oil for ascertaining its growth influence upon rats. He reports that the food given to the rats was fat free, “but contained enough protein and water-soluble vitamines, as appeared from the fact that addition of an ether-extract of egg yolk made it sufficient for growth. Addition of cocoanut oil, on the contrary, had no growth-promoting influence. We conclude therefore that cocoanut oil is poor in fat-soluble vitamines.” Dr. JANSEN was apparently not aware that E. V. MCCOLLUM (*American Journal of Physiology*, Vol. 41, 1916) had already arrived at a similar conclusion from examination of deodorized cocoanut oil used as a vegetarian suet or lard substitute. The addition of these independent experiments, however, leaves no doubt as to the inferior dietetic value of the oil.

Food Protection.

In the neighbourhood of Camp Lewis, Washington, according to the Annual Report of the United States Public Health Service for

* *Mededeelingen uit het geneeskundig Laboratorium*, 1918, p. 78.

1918, tradesmen in the surroundings of the military zone gladly spent "thousands of dollars in necessary sanitary improvements"; under the indirect pressure of the Army authorities forbidding the soldiers to patronize restaurants which had not been certified by the Service, "Special sanitary regulations were drawn up and put in force and a corps of inspectors was placed in the field. Two certificates were used, a white one for establishments complying with all service regulations, and a pink one for establishments which were considered safe from a sanitary point of view but which did not comply with all service regulations. . . . Later, this sanitary work was extended to all food establishments in the zone. Health certificates were required of all food handlers." The desired result was attained; "the possession of a Public Health Service certificate has come to be recognized as a necessity to ensure the success of any business which caters to the Army."

Vomiting Sickness.

The work of Dr. H. SCOTT in settling the long dubious question as to the nature of "vomiting sickness," by showing that it was due to the ingestion of the fruit known in Jamaica as "ackee" (*Blighia sapida*) induced Dr. A. CONNALL, Director Medical Research Institute, Lagos, in conjunction with the Government Chemist (W. RALSTON, B.Sc.) to make enquiries as to whether the fruit was connected with any similar trouble in West Africa. The local name is "isin."

It was found that this fruit is used both by natives and Europeans. Aqueous decoction administered to puppies resulted in death. Post-mortem sections of their livers revealed conditions similar to those described by Dr. Scott. It is nevertheless considered that the local *Blighia sapida* is less deadly than that found in Jamaica; as no periodical sickness occurs notwithstanding its considerable use. The ripe fruits of both the "ackee" and the "isin," however, seem to cause no illness in any case when properly cooked.

WATER.

Water-Screening.

If water *must* have its surface exposed in the neighbourhood of dwellings, the necessity for its protection by means of wire gauze at possible points of access by mosquitoes is well understood. To maintain correct conditions of any defence demands, however, a certain amount of vigilance by house-owners. To find therefore that this mode may be safely dispensed with in some particular circumstances, is of advantage. Observations by Surgeon W. W. KING of the U.S. Public Health Service [*Public Health Reports*, Feb. 28, 1919, pp. 386-390] shows that the mosquito dealt with by him—the *Culex quinquefasciatus*—has an objection to proceeding for any considerable distance along the length of pipes placed horizontally, although it has no such compunction when entering or leaving a pipe placed vertically. He sums up his results as follows.—

"(a) Mosquitoes entered and left cisterns through unscreened perpendicular waterspouts $2\frac{1}{2}$ and 3 inches in diameter and 14 and 10 feet high.

"(b) Mosquitoes did not enter cisterns through larger unscreened water spouts when these pipes had a horizontal section from 12 to 32 feet long. No observations were obtained of a horizontal distance of less than 12 feet.

"(c) Mosquitoes bred in the cisterns and septic tank and having no other means of exit passed through horizontal pipes 4 and 5 inches in diameter for a distance of 191 feet in the longest instance, aided probably to a certain degree by air currents. No doubt they would pass through greater distances, but there was no opportunity to observe any instance of it"

Sub-Soil Water Flow.

The considerable recent additions to the irrigated areas of the Punjab have effected changes which are attracting attention in respect to economy of water, and to influence on malaria propagation. Certain authorities would urge solely the further control as to quantities of water furnished to the agriculturist (whose main idea is frequently that the more the water used the more the rice crop) whilst others would stay seepage by lining canals, and would restrict still further the employment of canal waters when it is obvious that the subsoil contains the wasted fluid, which can be lifted by electric power for performance of its function in agriculture. To arrive at any sound conclusion as to the latter suggestion, it is first necessary to acquire a knowledge of the quantity of the subsoil water, its direction, height, and so forth.

To this end, as reported by "Indian Engineering" (Calcutta) of January 25, 1919, at the last Punjab Engineering Congress, Mr. C. G. MAY read a paper on the subject. In this, the great distances over which factors tend to raise the subsoil water table was well illustrated. Thus it was shown by Dr. SUMMERS five years back that the 60,000 cusecs. abstracted from the tributaries of the Punjab, by the canals, represent an equivalent of an area of 10,000 square miles covered with water to a depth of five feet. The author of the paper contended that much of this mass of water flows back as subsoil water and adds to the cold weather supply of the Indus in Sind, and cited the fact that "when the river supplies are at their minimum, the infiltration from the adjacent irrigated country into the Chenab river between Khanki and the Ravi junction amounts to 1,825 cusecs."

What is known as the Triple Canal Scheme will add considerably to the problems to be considered; in its incomplete condition, in 1916-17, 1,070,100 acres were added to the total; when in full working order, it will be capable of irrigating about two million acres. [Having regard to the shifting nature of the Punjab rivers, it seems to the writer that an important part of any study of subsoil water conditions in that area must take into account the existence of subsoil streams flowing within old stream beds. Thus the addition of subsoil water to a river when at its minimum surface flow need not be solely the percolation from irrigation into the subsoil, but the discharge at a point of junction of a dead tributary—represented in the present day solely by an invisible stream bed]

SANITARY ORGANIZATION.

INDIA.

Lt.-Col. Glen LISTON, C.I.E., I.M.S., President of the Science Congress for India held at Bombay (*Madras Mail*, 16.1.19 and 23.1.19) gave in his Address some illustrations of the difficulty of securing aid for sanitary advance in the past and, finally, referring to the Research Fund Association now in being, stated there was reason to believe "the reproach of apathy to research is passing," but called attention to a defect in organization as defined by him in 1911.— "At the present time in India there is too great a tendency to confine work and workers to special Departments, so that there is absence of mutual co-operation in the different Departments—the Sanitary, the Bacteriological and Clinical branches of our profession are becoming too specialized." Sir Leonard ROGERS, I.M.S., followed by giving an example of the occasional incompatibility of the financial and sanitary consciences of Governments. [That too great specialization is an evil there can be no doubt, but having regard to the rate of advance of science generally in the present day, specialism cannot be avoided, and that Departments under their respective enthusiasts must be formed accordingly, there equally can be no doubt. The real peril is not in the formation of Departments but, as ultimately defined by Col. Liston, their "absence of mutual co-operation," and this must be secured, whilst giving that independence of action and choice of route for advance to Departments which are essential if inhibition of enthusiasm and ultimate stagnation are to be avoided, by providing by definite official rulings (and not simply trusting to official courtesy or toleration) for the right of intercommunication and general aid on professional subjects direct *between executive officers*. Using the analogy of an Imperial Government, there should be no interference in the imperative mood between two countries under it at points where their mutual interests meet; their intercommunication and co-operation would be encouraged by the Imperial Government—in the knowledge that the Head of each country (necessarily a specialist and enthusiast in his country's interests) will do his best for his particular charge, the Imperial Government would act when these interests clashed or were neglected, in the interests of the Empire. Organization securing the co-ordination of important branches of Science for the attainment of the health and welfare of a nation, cannot afford to ignore human psychology. A system such as advised in the diagram attached to the Note at p. 471, of Vol. 5, No. 8 (Sanitation Number) of this *Bulletin*, of June 15, 1915, should certainly secure the desired end of "mutual co-operation" between the curative and sanitary branches of the profession, and between these and all lay departments dealing with the welfare of man and beast.]

EGYPT.

The early adaptation of hygiene for communities is as essential in obtaining health, wealth and wisdom as early rising is, according to the proverbial ruling. It is not without consideration the writer has used the term "for communities," in qualifying the early use of hygiene, instead of *by* communities; in the early stage of communal

life in the less advanced areas of tropical and sub-tropical countries, this is the chronologically correct procedure. It does not fit in with the experience of any sanitarian of the slightest practical experience to conceive that to push academic education so as to precede sanitation, and trust to it for the awakening of a "sanitary conscience" thereby, will bring about the sanitary salvation of communities. The only form of Education (and there is no more powerful form) *ad hoc*, is that of the practical demonstration of the benefits of sanitation by sanitary works in being. In short, Education should accompany sanitary effort, not precede it. On this subject, the President of the Corporation of Madras (Mr. J. C. MALONY, I.C.S.) in the Introduction of the Report on Administration for 1917-18, affords the following exhortation.— "To remedy ignorance the Corporation can do something with its schools. But the three R's by themselves will not suffice; experience, even natural probability, declares that the grandchildren of the occupants of these dens must be sickly, poor and stunted wretches, whom no school teaching, however excellent, can save from physical decrepitude."

It is satisfactory therefore to find that a Commission appointed in the summer of 1917, by the High Commissioner of Egypt to advise as regards the future organization and work of the Department of Public Health has assumed no expectant treatment of hygiene, pending the development of education in that country. The composition of the Commission* was of itself a guarantee that its advice would be of a sound and practical nature.

The Commission thus describes the present condition of Egypt:—

"To day the greater part of Egypt is filthy, and no self-respecting populace can be raised in filthy surroundings. As of Old, Egypt is plagued by disease, and it is hopeless to expect a disease-ridden people to play their proper part in furthering the welfare of their country. The infant mortality of Egypt is appalling, actually one-third of the children born dying in infancy. The verminous condition of the *fellahin* shows no improvement, though lice are known to be conveyers of typhus and relapsing fevers which account for so many deaths."

After pointing out that Dr. Cyril GOODMAN, Late Asst. Director General of the Public Health Department, had done a vast deal for the improvement of sanitary administration, notwithstanding numerous difficulties which beset his work, they proceed to expand a scheme, the foundation of which is the abolition of the position of a mere Department under the Ministry of the Interior, and the formation of an independent Ministry of Health. The ground for the appointment of a Minister and the definition of the officer desired is as follows:—

"The health and physical welfare of the people is of such prime importance that it requires a separate Minister of the State to safeguard it, and to represent its claims. He should be one who has shown his interest in the people in social problems, in scientific work, and his words should carry weight in the Council of Ministers."

Under the Ministry of Health the Commission propose to place the following Chief officers:—The Under-Secretary of State, The Director General, Technical Adviser of Medical Intelligence, Director

* Lt.-Col. Andrew BALFOUR, C.B., C.M.G., R.A.M.C., President; Lt.-Col. G. E. F. STAMMERS, R.A.M.C., Mr. E. S. CRISPIN, Dr. Charles TODD, O.B.E., Members.

of Sanitary Services, Director of Epidemic Services, Director of Medical Services, Director of Lunacy, Director of Medical Education, Secretary General Director of Public Health Laboratories, Director of Sanitary Engineering, Technical Inspectors attached to the Central administration. For Provincial control, they advise Divisional Inspectors, Mudiriya Health Inspectors, Markaz Doctors, Inspectors of Nuisances-Conservancy Staff, Sanitary Barbers, and Qualified Sanitary Inspectors.

SANITARY SERVICE LABORATORIES.

Dr. Paul CLEMENTS, Chief of the Division of Sanitation in the Provinces, Philippine Health Service, in his Report for 1917 in discussing sanitary organization* affords definite views as to the rôle of Provincial Bacteriological Laboratories :—

"The provincial laboratories are a big help to the provincial hospitals, also to the dispensaries and to sanitary instruction of the students of public health schools, in making an extended study of the prevalence of intestinal parasites among the people and in prompt and early recognition of the presence of any communicable diseases in the province. In a general way the provincial laboratories facilitate the investigation work of the district health officers, make possible prompt diagnoses and control of communicable diseases, and where specially its advantage is to be valued is in the detection of carriers during epidemics. While during epidemics the laboratory can save time, money and lives, by securing the prompt control and disposition of cases, during normal times, with a systematized work in close relation with the work of the district health officer, it advantageously assists him in keeping thoroughly posted as to the local sanitary conditions and it specially serves as a warning for a contingent outburst of an epidemic by detecting either the first case or the carriers.

"The laboratory also acts as a politico-social measure especially in cholera epidemics because the immediate bacteriological diagnosis of the first cholera case locates the carriers and quarantine is imposed upon only those persons who should be quarantined and thus the opposition of the people to the sanitary measures taken is reduced to the minimum. It may be emphatically stated that a provincial health organization cannot be considered complete without a provincial laboratory."

[It will be seen that whilst Dr. Paul Clements recognizes that Sanitary Service Laboratories would be a "big help" to Provincial hospitals and dispensaries, he has nothing to say in support of the opinions of clinicians which at times imperil the functions of laboratories, primarily intended for sanitary ends, which happen to afford them this aid. The very slender fact that—as Dr. Clements notes, hospitals and dispensaries would be afforded aid by such laboratories, and also that the sanitarian, in the course of research on certain subjects, would gladly avail himself of material from wards and post-mortem rooms of hospitals, is frequently advanced as an overwhelming reason why Provincial Sanitary Laboratories should be attached to Hospitals, and, *a fortiori*, be ruled not by the Sanitary but by the Medical branch of an organised Service. Where such ideas are allowed to prevail, there can result but one end—concentration upon the clinical aspects and curative problems of disease. It is true that, at times, facts may come to notice which the sanitarian may find of advantage in disease prevention—but, inevitably, a Sanitary Service laboratory ruled by the Medical branch of a Service will ultimately become simply a glorified Clinical Laboratory. Equally, a Clinical

* Report of the Philippine Public Health Service for 1917, p. 87.

Laboratory "run" by a sanitarian would become a centre for Preventive Medicine. The claim of the man of Curative Medicine to rule a Provincial Sanitary Laboratory might as reasonably be set forth by the Entomologist, the Sanitary Engineer, the Chemist, the Veterinarian, the Architect, the Barrister, or the Agriculturist. To think otherwise is to ignore the psychology engendered by professional enthusiasm inherent to both the Curative and Preventive Medicine branches of the profession, and the impossibility (compatible with efficiency) in the present day for men not possessed of super-normal abilities to do otherwise than affect a speciality.

That mutual aid without overlapping of the two distinct classes of laboratories and research workers can be secured under an organised Medical and Sanitary Service in the tropics, is illustrated in the diagram furnished in this *Bulletin* (Sanitation Number), Vol. 5, No. 8, June 15, 1915]

INFANT WELFARE.

According to Dr. TURNER's Report, as Executive Health Officer, Bombay Municipality, for 1917, the infant mortality in the City (Pop., 979,000) during the year was at the rate of 304.25 per mille of births. This affords a considerable contrast to that reported for 1916 by the Medical Officer of Health (Dr. J. M. SUCKLING) for the Metropolitan Combined Districts of Sydney. Dealing solely with the Metropolis proper having a population of 764,000, he has the gratification of stating that the infantile death rate *per mille* of births was 67. On the one hand there is exhibited an appalling mortality and, on the other, a contrast showing what is possible at the hands of Nature, in the presence of reasonable sanitary conditions. It is of course well recognised that infant mortality—especially in large cities—is a delicate standard by which hygienic circumstances may be gauged; that this relation of sanitation to infant mortality exists in the present example is ascertainable by regard to statistics of previous years. From 1880 to 1898, the rate in Sydney varied from a maximum of 192 per mille (1880) to 129 (1897) as a minimum; by 1903, the rate finally left enumeration by three figures and, during the five years ending 1916, the average has been 72. That this decrease of mortality represents improved eugenics affecting the general population (thus bearing out the trust in infant mortality being a delicate gauge) is shown by the statistics of deaths in the Metropolitan area from "all causes"; in the five years ending 1894, the average death rate of the population was 15.4, against 10.5 for the five years ending 1916—implying in the quinquennium no mean saving of life.

Dr. Turner has taken special interest in pressing upon attention the heavy infantile mortality in the City of Bombay. In an analysis of death causation in infants, he states:—

"It will be observed that out of the total mortality under 1 year of age, over 36 per cent. occurred in the age group of 7-12 months and further, that of the deaths at this period of life, more than half are due to diseases of the respiratory system. In the first and second-age groups, the maximum mortality is due to debility and the diseases of the respiratory system, respectively. The next most fatal cause is diseases of the nervous system in the second and third groups, and diarrhoea and dysentery in the third group, all of which signify exposure and defective feeding."

In regard to environment of the infant population in Bombay, he gives the following analysis of rooms occupied in relation to infant mortality and percentage of births registered :—

	1 room and under.	2 rooms	3 rooms	4 rooms or more.	Road- side.	Hos- pitals.	Total.
1916	45.44	37.39	23.01	23.82	171 18	9.18	38.78
1917 . . .	48.14	43.04	27.15	26.57	112 19	11 76	40.96

There is here expressed a relation between housing and the want of it. But infantile mortality so fully depends upon the numerous factors which go to influence eugenics that it can only be when mortality is reduced to such small figures as exhibited in the Sydney Report that the sanitarian will be able to say—here is *the* cause of the preventable deaths in an infant population ; and it is for this reason indeed, that infantile mortality forms a barometer whose warning is not negligible. Hence, having made an analysis of causes such as is possible from statistics, Dr. Turner strikes a right note when, as pointed out by the Sanitary Commissioner for the Government of Bombay (p. 7, Annual Sanitary Report for 1917), he has stated “that the problem is too vast for the Health Department to grapple with alone, and that private enterprise is necessary.” Such aid under a scheme inaugurated by Lady Willingdon is foreshadowed by the establishment of pasteurized milk depots in the City of Bombay, whilst ten Municipal nurses and midwives have been appointed to undertake house visitation.

In dealing with infant welfare efforts by private bodies would seem especially necessary, as something more than dry official advice is required where but partially educated mothers are concerned. There must exist a sympathy which may not come readily to even a lady Medical Officer of Health, interested as she might well be in dry statistical facts. To fit into the problem of requirements there must be the *unpaid* “motherly woman” determined to help her fellow women ; and this can probably be best attained by looking to each community to elect suitable persons for this purpose, and thus form officially recognized Committees dealing with the subject. But to make such unpaid labour effective there must at least be funds on which to rely—as advice, although sound in itself, could be productive of little good if the eugenics of infant life be not improved, and this implies expenditure. Few in the present day will quarrel with the idea that such expenditure should not depend upon the intermittent sympathy of private philanthropists, but forms a reasonable demand upon the public purse. This idea seems to underlie an excellent piece of legislation enacted by the Philippine Legislature in aid of “Women’s Clubs.” The following are extracts from the enactment concerned and connected matter, as described at p. 166 of the Report of the Philippine Health Service for 1917 :—

“There is hereby appropriated, out of any funds in the Insular Treasury not otherwise appropriated, the sum of one million pesos, which shall not be set up in the books of the Auditor until allotted administratively, for

expenditure, in the discretion of the Governor-General, in the provinces organized under Act Numbered Eighty-three . . . to assist in the campaign for the protection of early infancy, including the establishment of 'Gotas de Leche' wherever it may be feasible and necessary. *Provided however*, That in order that a province, municipality, or township may obtain the aid herein authorized, it shall be required to contribute, either by appropriation out of its own funds, or by voluntary subscription, or in any manner other than by direct or indirect aid of the Insular Government, a sum equal to that which the Governor-General is ready to invest in such province, municipality, or township: *Provided, further*, That the technical plan of the work contemplated shall be approved by the 'Liga Nacional para la proteccion de la Primera Infancia.' *And provided, finally*, That in connection with such work, any officer or employee of the Insular, provincial, and municipal governments shall serve gratuitously when so directed by the Governor-General, and any officer or employee so directed who fails to render satisfactory service may be summarily removed.

"The Governor-General shall include in his annual message to the Philippine Legislature a detailed report of the work for the protection of early infancy performed in accordance with the provision of this Act.

"In view of this law many women's clubs, after having raised sufficient funds by voluntary contributions of their members and other persons, applied for the aid mentioned therein, stating that their organizations would undertake a campaign against infant mortality in accordance with the plan set forth in the circular of the Liga Nacional para la Proteccion de la Primera Infancia issued April 15, 1916. . . . In order to protect Government interests, it was required that the work of these institutions be placed under the auspices of the province, municipality, or township where such institution has its headquarters; in accordance with which the by laws provide that the treasurer shall be the provincial, municipal, or township treasurer, as the case may be, and the secretary the local health officer; and it is required that before filing an application for Insular aid the treasury shall contain an amount at least equal to the aid requested.

"The following extract from the articles of incorporation of the *centros de puericultura*, translated from the Spanish form given in the circular of the Acting Secretary of Public Instruction, gives an idea of the sphere of action of these institutions.

"2. That the purposes for which this corporation is formed are to educate and instruct mothers in the care of their children, and to this end, the corporation must.

"(a) Establish a clinic in which children under two years of age may be examined and treated to improve their health and growth, as well as to give proper instructions to expectant mothers with regard to their health and to the care of their babies beginning from the date of their births.

"(b) Employ nurses to make house-to-house inspections of expectant mothers, to attend them during confinement, to take care of and protect the newborn infants and to give instructions relative thereto.

"(c) Organize baby contests, give lectures upon matters pertaining to the care of expectant mothers and children, and distribute literature which contains advice and instructions relative to the protection of early infancy.

"(d) Organize exhibitions and celebrations for the purposes of securing funds for the maintenance and operation of the institution."

SANITARY RULINGS.

PORTS AS SANITARY OUTPOSTS.

The important port of Rangoon is up to date the chief gate of Burma, the direct rail communication with Calcutta *via* the coast, and with China *via* Yunnan, being still dreams of the patriotic economist. The frequent introduction of small-pox into Burma, following the immigration of Indian labourers to an average annual extent of 264,000 forced itself upon official notice. Legal rulings as to examination of passengers to and from Indian Ports varied from time to time; but, during the period of the strict observance of the Venice Convention, these were conducted with an efficiency which enabled numerous facts bearing on the matter to be accumulated. From 1901 to 1908 and 1916, when all passengers were subject to inspection by a scrupulously careful Port Officer (Dr. Arthur Foy) an average of 35.5 cases of small-pox were detected per annum, with the result that no immigrant suffering from small-pox was discovered after landing; in 1909 and 1911 under altered rules, however, when passengers were inspected for three months only and in the remaining months the responsibility was thrown solely upon the Master of a vessel, there were 21.8 cases of small-pox declared by the Masters, but, in addition, 14 cases were detected after being allowed to land. Again, in 1910 and from 1912-15, both inclusive, when the responsibility for declaring cases lay solely on the Masters of vessels *for the whole year*, the declaration of cases fell to 5.8 per annum; but cases detected after they were allowed to land without notification increased to 29.7. In a tidal river each minute of time may be of financial importance, but it became obvious that the withdrawal of inspection by the Port Health staff could not reasonably be substituted by looking to busy Masters of vessels for declarations. To meet the condition of affairs thus brought about, the Burma Vaccination Law Amendment Act, 1909, was passed. This was to the following effect:—

“9. (1) When a vessel arrives in the Port of Rangoon, or in any other port to which the Local Government may by notification extend this section, the Health Officer of the Port, or any other officer specially authorized by the Local Government in this behalf, may, if he thinks fit, require any person who has travelled on board the vessel for the purpose of coming to Burma to work as a labourer to be inspected and if on inspection he is found to be unprotected to be vaccinated; and every such person shall, if so required by any such officer, forthwith proceed to such place as may be specified in this behalf by such officer for the purpose of inspection and vaccination and shall remain there until he is permitted to leave, and shall, if unprotected, before leaving such place submit himself to a vaccinator for vaccination. Provided that this section shall not apply to any vessel belonging to or in the service of His Majesty or the Government of India, or to any vessel belonging to any foreign Prince or State.

“(2) For the purpose of sub-section (1) every person who when so requested fails to show by documentary or other evidence that he is not a labourer shall be deemed to have travelled on board the vessel for the purpose of coming to Burma to work as a labourer.”

During the war period, the scarcity of ships on the route from India to Burma was unavoidably followed by much overcrowding, and, doubtless ship passengers here, as in other parts of the world, lacked many comforts. There resulted a peculiarity of Indian conditions

which apparently had not been sufficiently regarded in framing legislation. The Act specified persons "coming to Burma to work as labourers," and this was guarded by the requirement that in the absence of documentary evidence to the contrary vaccination was not to be escaped. But amongst the "would-be-rich" persons of both Europe and Asia are to be found those who probably pay much heed to the proverb that if the pennies be cared for the pounds will take care of themselves; consequently, the literate and rich man who elected to save money by consorting with coolies for the few days of the voyage, and did not have the forethought to provide himself with exemption documents, found himself liable to vaccination. Complaints followed, and the Government of Burma appointed a Committee* to investigate the matter. With one dissentient (Dr. P. J. Mehta, who had been nominated by the Social Service League, and who happens to be an advocate of the anti-vaccination crusade) the views of the Committee were as follows:—

"The logical conclusion is that the only precaution which will effectually safeguard the Province from the danger of small-pox infections through the medium of passengers arriving by sea—a danger which we have given reasons for considering serious—is that all such passengers with the exception (a) of those who have had small-pox and (b) of those who have been vaccinated less than ten years prior to the date of arrival, should be vaccinated on landing. The only infected persons who could escape through this cordon would be those who were infected with the disease in the later stages of the incubation period when vaccinated and in whom small-pox would develop and run its course despite the vaccination. The committee places on record its opinion that such are the only measures which would afford really effectual protection. Many other considerations must, however, be taken into account before their adoption can be recommended. If they appear revolutionary it may be noted that systematic re-vaccination of incoming passengers was strongly recommended by the Municipal Committee of Rangoon as far back as 1898, when measures to cope with the bad epidemic of that and the following years were under consideration.

"The only passengers who are subject to inspection at all are those passengers who are travelling for the purpose of working as labourers. All passengers outside this category and all passengers under fourteen years of age are allowed to land without question. Further the definition of 'unprotected person' is scientifically incorrect. It is far too narrow; only persons who have been successfully vaccinated within a given period, say ten years, should be assumed to be protected from small-pox by vaccination."

Whilst thus fully supporting the view that compulsory vaccination of incoming passengers is essential, the Committee point to a decidedly weak factor in the legislative ruling concerned:—

"The difficulty of the distinction between passengers coming to Burma to work as labourers, who alone are liable to examination, and other passengers, should, in the opinion of the committee, be met by an amendment in the law abolishing the distinction and rendering all passengers arriving in Rangoon liable to inspection and to vaccination if found unprotected. The law as it stands is a good sample of a type of class-legislation, vicious in principle, and now happily rapidly becoming obsolete. As has already been shewn it has been misinterpreted in the popular mind and the mistaken impression so created has given rise to bitter

* Lt.-Col. O. J. OBBARD, I.A., Commissioner, Pegu Division, Chairman; Mr. Gavin SCOTT, I.C.S., President, Rangoon Municipal Committee; Lt.-Col. PEARCE, I.M.S., Director, Pasteur Institute; Mr. E. O. ANDERSON, Chairman, Burma Chamber of Commerce; Dr. P. J. MEHTA, M.D. (Brux.); Maung Po HAN, Barrister at Law.

resentment when the mistake was discovered. Let it be widely known that all passengers without distinction are subject to the law and there will be no legitimate ground of complaint. The Act has been enforced since March, 1916, and we know now by experience that its enforcement has done nothing to hamper the free arrival of the labourer, the immigrant who is really required for the economic welfare of the Province. Immigrants of other classes, the classes who have complained most bitterly of the hardships involved in the enforcement of the existing law, should not be given the opportunity of saying that they came here under the impression that they would not be required to undergo this ordeal, they should know definitely that there are no exemptions and then decide whether to put up with the law or avoid it by staying at home."

[This plain speaking by the Committee the writer thinks of much value, as indicating a provision which should not be neglected in any matter touching sanitary legislation. It is not difficult to secure a legal ruling on the widely accepted basis that the minority must suffer for the majority in respect to inconveniences brought about by sanitary legislation; those concerned are usually sufficiently optimistic to believe that they personally may never be called upon to undergo their burden.

It is quite another matter, however, to obtain a ruling that shall require a probable general infliction of inconvenience, however temporary, upon all classes of communities alike; yet it is politically the most prudent thing to do, irrespective of the innate justice involved. There should be no question in applying sanitary legislation that every human being shall be treated in disease prevention under that principle and no other; with the provision that prejudices of classes and races be met, where distinctly requisite, by modification of *methods*, so long as the demands for fully effective sanitary requirements are in no way stultified. In illustration, the writer would point to the fact that, for a series of years, the Government of Madras without popular discontent required the passport system against plague to be enforced amongst over forty million people. The Madrassee is ordinarily a law-abiding subject; but, as many events have proved, is quite capable of exhibiting a riotous tendency. At the hands of the Madras Government the procedure was carried out without any untoward result, notwithstanding the numerous races, castes and creeds involved. In the opinion of the writer, this success was entirely due to the determination in word and deed of that Government to enforce the law with absolute impartiality. In the absence of obedience, the highest official was punished as promptly as the coolie; both were made to understand in attempts at evasion that the arm of the Law is long. Under methods less exact the system was imitated in two other Provinces, and necessarily proved impracticable.]

That the Burma Government legislation as to vaccination, notwithstanding complaints as to its severity, really fell short of requirements sanctioned in more advanced countries for the protection of the majority at the possible inconvenience of the minority, is well illustrated by the following examples of legislative rulings carried into effect in America, as culled from the Annual Report for 1918 of the U.S. Public Health Service:—

"Vaccination was performed at the various border quarantine stations against persons coming from Mexico who did not present evidence of immunity, either through a recent attack of small-pox or the disease or a recent successful vaccination. The vaccination requirements applied not

only to persons from the interior of Mexico but also to local travellers. At various national quarantine stations on the Mexican border, there were vaccinated during the fiscal year some 47,196 persons (p. 165).

Laredo, Tex. "All passengers who do not show satisfactory scar of recent vaccination against small-pox are vaccinated before being allowed to enter." (p. 182).

Rio Grande Quarantine Station—During the year, there were inspected 1,638 from the interior of Mexico and 6,986 local travellers; 989 persons were vaccinated against small-pox, and 308 were treated for the destruction of vermin. Routine vaccination at this port has practically eliminated small-pox in this region, whereas formerly it was usual every year to have a local epidemic of disease, either on the Mexican or Texan side of the border."

The result of the Committee's enquiry has been that the Government of Burma, whilst arranging to ensure that the Act shall be applied "with the least possible inconvenience to the passengers affected and that it is not applied to persons who do not fall within its scope," and to improve the accommodation for carrying out the Act as it exists, have directed that modifications be at once considered so as to make it more effective by "by rulings that will bring it into stricter accordance with the law and the highest possible requirements of sanitary science in their application—especially in respect to the existing prohibition of vaccination of immigrant children under 14 years of age, and the exemption of persons who are not of the labouring classes."

EFFECTIVE VACCINATION.

The following are extracts from the Vaccination Ordinance put in force in Northern Nigeria (Nigeria: Annual Medical and Sanitary Report, 1917, p. 125):—

"Section 8 deals with the vaccination of adults—persons who are or appear to be 14 years of age or over—in a prescribed area; it prescribes a time limit for each adult concerned; and it lays down the manner in which adults shall attend, primarily and subsequently, in conformity with the procedure indicated under section 7.

"Section 9 deals with the vaccination of children—children who are or appear to be under 14 years of age—in a prescribed area; it prescribes a time limit for each child concerned; and it lays down the manner in which parents, or persons having the care or custody of children, shall attend with the children, primarily and subsequently, in conformity with the procedure indicated under section 7.

"Section 10 confers upon every public vaccinator and any person acting on the instructions of a public vaccinator, within a prescribed area, right of entry, universal as to place, but limited in the exercise thereof to stated times. This right of entry carries with it the authority to inspect every adult and child found in any premises entered, and thereupon to vaccinate every such adult and child who has neither been previously vaccinated successfully nor already had small-pox.

This section further provides that in the event of an epidemic of small-pox the Medical Officer of Health may order re-vaccination within a prescribed area; in which case, the functionaries alluded to may re-vaccinate any adult or child who having been previously vaccinated shall fail to satisfy them that such vaccination has been within a period of seven years.

"Under section 16, the Governor in Council may make regulations prohibiting arm to arm vaccination either generally or in any specified area, and generally for giving effect to the purposes of this Ordinance.

"Under the Ordinance, when a vaccination results in marks the areas of which taken together do not amount to half a square inch, that vaccination must be returned as unsuccessful; and, when the marks left by a

previous vaccination fail to attain this minimum, the individual bearing them must not be numbered with those persons who have been previously vaccinated."

[Of the sanitary efficacy of these rulings there can be no doubt and, if workable, the much required protection from small-pox epidemics which is requisite in Nigeria may be looked for. It would, however, have probably saved complications had the matter of area of "marks" of vaccination not been afforded a legal definition; such matters would be more fittingly treated in any executive Orders necessary for regulating the action of persons engaged in vaccination. A difficulty certainly would be presented in attempting to prove that a subject bearing vaccination marks of less than half a square inch had not been vaccinated successfully; in the sense that he would, for the present, be immune to further attempts to vaccinate him. Moreover, whilst it is useful to secure half a square inch of *vesiculation* GAYTON'S standard size of *scar* is naturally less. The enforcement of re-vaccination during epidemics within prescribed areas, should prove a valuable addition to weapons at disposal when fighting an epidemic. The Section dealing with this probably records the first instance in the British Empire of re-vaccination being rendered compulsory *in a community*; although Gloucester City after its epidemic experience would not have objected thereto.* In Germany re-vaccination is compulsory at 12 years of age, whilst the male citizen has the advantage of a second re-vaccination on entering the Army. As is well known, these precautions have served Germany well, having regard to her unfavourable experience in 1871-2. The limiting of compulsory re-vaccination to periods of epidemics and within defined areas, as now proposed in N. Nigeria, places its acceptance by a population under the most favourable circumstances.]

VACCINES.

It is in the interest of the public that individual members of a community should be protected against conveyable diseases; and hence it is logical that the State should provide the means at public expense for all desirous of rendering themselves immune without—should the individual so elect—the procedure implying a tax upon private funds. The doctrine savours of ultra-socialism, but, in practice, would not likely result in members of a community capable of bearing the cost of immunization trenching upon public funds. In Australia, free use of anti-typhoid vaccine has for some time past been arranged for. The United States Public Health Service, in a circular dated May 16, 1917, made the following announcement:—

"Any person in the United States may receive, without cost, upon applying in person at those places designated by the Surgeon-General of the United States Public Health Service, vaccination against any one or all of the following-named diseases; small-pox, typhoid fever, paratyphoid fever.

"Medical officers and others charged with the duty of performing such vaccination should make requisition for the materials necessary therefore, and shall render monthly report showing the names of those so vaccinated, their addresses, and the date of the said vaccination. Upon the request of any person so vaccinated certificate of vaccination may be issued."

* *Lancet*, 1896. p. 247.

SANITARY FORETHOUGHT.

Dr. M. Cameron BLAIR, Senior Sanitary Officer, Northern Nigeria in his Report for 1917 embodied in that of Dr. PICKELS, the Principal Medical Officer of the Province, enters very fully into the question of legislation for the area under his sanitary care. Throughout his explanation of what has been done for sanitary legislation, he upholds the view that he is dealing with a Province which is destined to be of great economic importance in the Empire, as soon as peace is declared. Hence, being a believer in the axiom that "prevention is better than cure," he has not let the fact that such accessory items of municipal administration as factories, workshops, breweries, dairies, aerated water manufactories, public laundries and wash-houses do not yet exist, render him less cognizant of their future probable evolution. Provision for their due sanitary care has therefore been made. This forethought makes a strong contrast to the usual procedure, which is to allow these accessory items to make their appearance, prove themselves a danger to the public, and, thereafter, be duly noted as involving a change of the text of existing law, which will be brought about when a sufficient mass of demands for revision is accumulated—a matter perhaps of years. As befits the sanitary adviser in a tropical possession, he takes care to show that prejudices of race and religion are not needlessly offended, and where they are genuine are not interfered with.

In offering samples of the legislation put in force, Dr. Cameron Blair shows that sanitary organization is supported by giving a definition of Health Officer, which provides that whilst a Sanitary Officer appointed to an area is within it and on duty he has the power of directing sanitary work and giving instructions to sanitary inspectors. This function passes to the Medical Officer in medical charge of an area, should no appointment of a Sanitary Officer have been made. Sanitary Inspectors become *ex officio* Police Officers for the purposes of Acts dealing with sanitation. An important link in organization is provided for by "The Diseases of Animals Ordinance," which confers considerable power upon the Chief Veterinary Officer, enabling him to deal effectively with animal diseases not only in relation to cattle but also to human welfare. *Inter alia*, he is given powers "for prescribing the mode of disposal of carcasses of animals dying of disease; for the disinfection of persons, clothing, buildings, railway vans, and trucks of carriages wherein any animal shall have been placed, kept or carried; and in short, for stopping every legal loop-hole of escape from the provisions of the Ordinance." In closing his notice of this Ordinance, Dr. Cameron Blair shows that he grasps the importance of collaboration of the various Departments under a Government dealing with man and beast and their environments, so that sanitary measures shall be evolved and directed by the Chief Officer of a Sanitary Service with the intimate knowledge of conditions thus alone capable of being rendered available.

He states:

"It is, and has been for more than a generation, a recognized fact, that veterinary and human medicine, respectively, lose half their usefulness if they do not work hand in hand. . . . It is useless to labour this highly important but very obvious fact."

The following conditions regulating new townships are of particular interest :—

"The area which it is proposed shall be declared a Township is first of all set out by the Department of Surveys working in concert with the Senior Sanitary Officer who selects the various quarters, localities, reservations, open spaces, etc., and their relative positions within the Township boundary.

"(1). The European Reservation shall be separated from the Non-European Reservation by a Neutral Zone having a minimum breadth of 440 yards, or two furlongs.

"(2). No residential building shall be permitted on the area known as the Neutral Zone, under any pretext or circumstances whatsoever.

"(3). The European Reservation shall be completely surrounded by a ring-fence of Neutral Zone of a minimum breadth of 440 yards.

"(4). The two Reservations, European and Non-European, together with the Neutral Zone, the Market, Public Buildings, Factories, Banks, Stores, etc; are all included within the Township Boundary; but the European Reservation cannot approach the Township Boundary by less than two furlongs; for it is surrounded by the Neutral Zone, which itself is within the Township Boundary (pp. 129-130)

"(5). All European trading sites, on which Europeans reside, must be situated within the European Reservation: and all trading sites, on which Non-Europeans (other than *bona fide* domestic servants of Europeans) reside, must be situated within the Non-European Reservation.

"(6). Non-residential buildings, such as Court Houses, Club Houses, Places of Worship and the like, and parade grounds, gardens, recreation grounds and even cemeteries, may be permitted on the Neutral Zone at the discretion of the Governor."

DIFFUSE LEGISLATION.

In his Review of the work of the Public Health Service, New South Wales, for 1916, Dr. Robert T. PATON (Director-General of Public Health) invites the attention of the Minister of Public Health to a condition which is liable to attend efforts to keep pace with advancing requirements of sanitation—namely, the evolution of numerous Acts leading to both administrative and legal trouble. He states :—

"Many of the provisions for the control and safeguarding of the public health are however to be found in other legislative enactments than the Public Health Act, as for instance the Local Government Act, Dairies Supervision Act, Noxious Trades Act, Cattle Slaughtering Act, etc. The dissemination of legal provisions for the safeguarding of public health in so many different Acts constitutes a weakness in administration... As an instance may be quoted the extensive public Health regulating powers contained in the Local Government Act. This Act is not within the direct administration of this Department, and desirable supervision over the very valuable public health provisions of that Act can only be exercised by a roundabout and difficult process; more direct administrative authority by this Department is therefore essential... Above all is essential the consolidation of all legislation dealing with public health into one comprehensive Act. Any amendment introduced should aim at conserving and extending elasticity of control of the public health by granting powers to the Board of Health."

The tendency to diffuse legislation to which attention is thus called by Dr. Paton is well worthy of attention by the Sanitary Advisers of Colonial Governments at a period when, with peace in sight, renewed interest in matters sanitary may be hoped for. As it happens in areas where much advance has been recently secured, there is the danger of both legal and sanitary problems being complicated by the various readings of a tangle of Ordinances. As an instance of the

necessity of seeing that piecemeal legislation should take cognizance of the Sanitary organization to which must be entrusted advisory if not administrative powers, the following extract from the Annual Report of the Superintending Medical Officer, Jamaica, for 1918 (p. 7), is cited :—

“The position is as follows: The Central Board of Health is simply an Advisory Board with no power beyond calling upon the Governor to act and the Governor may or may not act, at times he does at others he does not—in the latter case the Central Board has to sit tight and look on — The necessity for a Superintending Inspector (Sanitary) with all the powers of a Health Officer is therefore apparent. . . . As at present there is no one to see that the various Sanitary Boards are carrying out the Law it is absolutely necessary, if improvement is to be made, that a Superintending Inspector should be appointed who will take the Law into his own hands and see that both the Law and the Bye-Laws are enforced.”

HOUSING.

When the Hindu emigrates to the Colonies in search of the wherewithal to pay for the ceremonies and vows of his relations (as befits an honourable observer of the “undivided family system”) he is apt to cause some astonishment to local sanitarians at the facility with which he finds loopholes in sanitary enactments, when his private benefit is at stake. He usually has a strong belief in the value of house and land property, and takes the trouble when about to make acquisitions to make himself acquainted with existing legal limitations—and, at times, he has found large and valuable areas for his advent to which none have been prepared. To this he adds a perennial perseverance to accomplish, it may be “little by little,” increments to a preconceived end of which few nationalities are capable. Once a dwelling of sorts is started of apparently fixed dimensions, it will be found to grow by almost imperceptible degrees either in the direction of the verandah or the backyard, till further expansion is inhibited by the like tendencies of the dwelling of a neighbour. It is a cult; and one with which only very careful wording of laws and sedulous watching by sanitary staffs can hope to cope. These tendencies are well illustrated by the following remarks made in the Introduction of the Administration Report of the Corporation of Madras, for 1917, by the President, J. O. MALONY, I.C.S.—showing flaws in the existing Act affecting housing within that Municipality :—

“(A) With the greedy or incapable landlord it may be thought that the Corporation has the power to deal. These powers on examination are seen to be inadequate. The law provides that any person wishing to lay out a street must first level, pave, metal, drain, and light the same to the satisfaction of the President. This obligation has hitherto been easily evaded. A person with building sites on his hands sells such at various times to various persons, and washes his hands of the matter. No single person remains responsible for the street. The Corporation must create the street, and at times buy from the several purchasers ground wherewith to make a sufficient street. Herein is seen an apathy of the people: why should any one buy a house site, if the seller cannot show a sufficient means of access to it? But suppose the vendor does leave vacant ground capable of being formed into a street. If he will not set the street in order, the Corporation can do the work and recover the cost thereof, *but only from the occupants of the street in proportion to the frontage of their respective buildings*. In the meaner streets such occupants are often miserably poor: nothing *can* be recovered from them; and the landlord safeguards himself and them by another ingenious device. The

buildings or building lots are let out with a provision that the occupants may be evicted at thirty days' notice. If A, and through A his landlord; be troubled, A is evicted ; B takes his place to be followed in turn by C, there is never any permanent person on whom responsibility can be fixed. In one case where the Corporation purchased land to widen the wretched lane serving for the approach to a nest of hovels the landlord asserted vehemently, but, so far at any rate, unsuccessfully, his right to build over the space originally left vacant.

"(B) Madras will begin to sit up and take notice when these people infect and kill their employers or some fairly prominent personage ; in default of a better, a Municipal President or Health Officer might serve the good purpose. The Corporation has discussed the possibility of acquiring and remodelling such slums, but the enormous cost of land acquisition always stands in the way. I fail to see why it should be so. Why should the Corporation the rate payer, pay money to an individual for permission to remove a danger to the public from his property ? If a Zamindar wastes his substance in riotous living the law will take from him his estate, set it in order, and hand it back to him after repaying itself all outlay and cost of supervision. The Zamindar merely wastes money ; the slum owner is wasting human life. If a landlord is greedy and will not, or is incapable and cannot, maintain his property in a habitable condition, why should such property not be condemned, taken over by a public body, set in order, and returned to the owner when all outlay incidental to improvement has been recouped ? "

SANITARY WORKS.

MAJOR ANTI-MALARIAL WORKS.

Local authorities all the world over in their treatment of finance for sanitary measures move (and at times forget to move) under like difficulties; there are always to be found Members of Bodies controlling funds who being (as they usually insist upon explaining) "practical men," will oppose the spending of hard cash on such faddism as attempting to convert a marsh into arable land—simply because a few inhabitants in its neighbourhood happen to suffer from malarial fevers. They may go so far as to concede that quinme may do some good, and that "oiling" is worthy of consideration; but drainage involving a major engineering project would be regarded as fatuous. Unfortunately, the peculiar psychology of these men is such as to preclude the necessity of estimates being framed before a decision is arrived at; being "practical" men they know, without such aid, that expenditure would run into untold thousands.

The conversion of this type of man is one of the interesting tasks which periodically falls to the sanitarian, and the more he can be armed against the ever recurring taunt of faddism, the more likely is sanitation to be advanced at his hands. In this sense, instances of anti-malarial major works were quoted in the Sanitation Number of this *Bulletin* of March 15, 1919 (Vol. 13, No. 3), which involved difficulties; demanding from the local bodies concerned, in the Mauritius, both faith in the utility of their endeavours and determination to see their successful issue.

A paper by LE PRINCE in the U.S. *Public Health Reports* of March 21, 1919, shows that accumulation of evidence is also appreciated in America, as a means of appealing to the "sanitary conscience" of local bodies. In the following instances which are quoted by him, it is evident that there was no want of physical difficulties which in less determined hands would have spelt failure:—

"In the environment of some cantonments and war industry towns the drainage problems have been simple and consisted largely of rechanneling existing watercourses and of pond control. At others large ditches were necessary and steam shovels were used. In some cases it was found more economical to install ditches by the use of dynamite.

"Wilmington, N.C., had an unusual problem. Close to and even within the town limits were extensive, abandoned rice fields subject to overflow and generally wet. It was necessary to repair or reconstruct dikes and to use tidal gates to prevent mosquito breeding; also a large shallow lake with about 6 miles of shore line is within flight range of both the shipyards located there.

"Chattanooga, Tenn., eliminated some former *Anopheles*' breeding areas by draining ponds to holes dug in the limestone formation where the water was absorbed; also the mosquito breeding in the large spring and lake near Camp Oglethorpe was controlled by using a subaqueous saw to remove the aquatic vegetation that furnished protection for *Anopheles* larvae.

* * * * *

"Near Macon, Ga., were six lakes and a large heavily wooded swampy area with soft silt bottom. Its feeder stream was diverted to the Ocmulgee River by means of a steam-shovel dug ditch. Ditches were extended into the main swamp, which was several miles long and had but little grade.

* U.S. Public Health Rep., March 21, 1919, pp. 548-553.

After deepening these ditches to a certain point, the pressure of the banks would cause the bottom of the ditch to rise. Saplings were used and laid parallel to the banks as a ditch lining or wall to support the banks. Stakes were driven to hold the saplings in place and were then fastened back to living stumps or trees close to the ditch. Later, as the banks dried, the ditch was deepened. The banks became solid and the bottom held to grade. As the silt and mud in this swamp area were too soft to dig to advantage, a large part of the ditching was done by dynamite. Several weeks after the swamp was drained its bottom became very hard. In installing some of the ditches the semi-liquid mud was so soft it could be bailed out. Before this work was started we were informed by the local authorities that the project was impossible and had a difficult time obtaining funds for its accomplishment.

"The problem near the aviation field at Millington, Tenn., was the removal of drift in several miles of a deep creek bed with low grade. Many of the collections of drift and log jams were 6 to 12 feet high, 50, 100 or more feet long, and contained many fallen trees and logs 3 feet or more in diameter. It was expensive, slow, and tedious work.

* * * * *

"Surrounding the cantonment at Jacksonville, Fla., is a sandy formation that will stand only on a very flat slope. The ditching there was made difficult by the presence of the roots of a palm plant. These roots are about as thick as one's arm and from them radiate smaller roots located close together and these make the removal of the main root expensive. A large part of the ditching work there was done by dynamite. Also in that locality a branch of the St. John River contains much tightly packed water hyacinth which had to be removed.

"In the vicinity of Montgomery, Ala., a large part of the ditching was accomplished by means of a ditching plow drawn by two mules. Mile after mile of ditch was thus installed at a cost of about \$55 per mile. The topography is fairly flat and the soil suitable for this means of ditching. Also some ponds and wet places were drained to a porous gravel substratum. The vertical drain holes were kept from silting up by means of screen entry boxes.

"Surrounding the cantonment at Hattiesburg, Miss., are sandy hills, but in the ravines are narrow areas of wet, silt-like formation 6 to 10 feet deep, penetrated by heavy masses of large roots. It was found too slow and expensive to excavate ditches by handiwork in such places, but drainage was accomplished by blasting center ditches and installing side seepage ditches where necessary.

* * * * *

"At most of the camps construction work was in progress, or troops were present, when malaria work was started; so, to a large extent, temporary measures were used at first, and permanent work done as rapidly and more or less thoroughly as conditions would allow in order to get as much relief as possible. *This work was accompanied or followed by complete drainage of areas within flight range of districts to be protected.*"

"In order to get immediate mosquito control in the Hog Island Shipyard district many acres of cat-tail growth had to be cut down and kept under oil control until the ditching systems were established. This was necessary also in other districts.

"Excellent results were accomplished by the Army Sanitary Corps within the military reservations. Most cordial relations existed between the officers of that corps (whose duty it was to prevent mosquito production within the military cantonment) and the officers of the United States Public Health Service, who directed similar measures on a strip of land one mile wide surrounding each cantonment in the cantonment town.†

* * * * *

"The cost of drainage, piling, supervision, equipment, and transportation averaged about \$1.80 per acre of territory controlled.

* * * * *

"The real estate values close to the south shore towns near Camp Upton can be doubled by an expenditure of about \$12 per acre on the

*†Italics not in original.

brakish marshes near by, but the fact is apparently not yet appreciated by the property owners and real-estate interests. Approximately half of the cantonment towns of the South have planned to continue mosquito-control measures, and there are yet others to be heard from.

* * * * *

"In certain instances where the town officials were under the impression that the expense of a mosquito drainage campaign would be beyond their financial ability, they were astounded to discover that the annual cost of screening houses and screen repairs greatly exceeded the cost of mosquito elimination. They did not realize the fact that it often cost a community, and the citizens of it personally much more to support a mosquito nuisance than to eliminate it.

"The president of a large association of cotton-mill interest has stated that the elimination of mosquitoes near the mill properties has paid a higher return on the money expended than any other investment that the corporation has ever made."

ANTI-MALARIA DRAINAGE.

To get rid of ground water by piercing an impervious layer of sub-soil underlain by a pervious stratum is an approved method of drainage with the agriculturist, but has not been much in evidence in anti-malaria measures. Limestone districts afford analogous favouring conditions at times, by swallow-holes being conveniently handy. For the protection of the health of employees building nitrate plants at Sheffield, Alabama, the State Board of Health concerned undertook anti-malaria measures in approximately 60 square miles. The usual methods of ditch and stream clearing and treatment of excess vegetation undergrowth were pursued, but an important feature of the work was the drainage of areas of which the topography as described is as follows:—

"North of the Tennessee River the topography is hilly, with level bottom lands along the river. Except for sloughs in the bottoms, the drainage is good. The larger islands contain swampy areas. A high bluff cut by steep and narrow gullies borders the south bank, beyond which the land is level to rolling. A number of drainage areas have no surface outlet, so that there are many ponds. In general, the soil is loam and clay overlying limestone, which outcrops in many places. Sink holes in the limestone region provide outlets for the surface water of some of the isolated drainage areas.

"As malaria carrying mosquitoes may fly one mile from their breeding places, all water surfaces within that distance of the area to be protected were considered a menace.

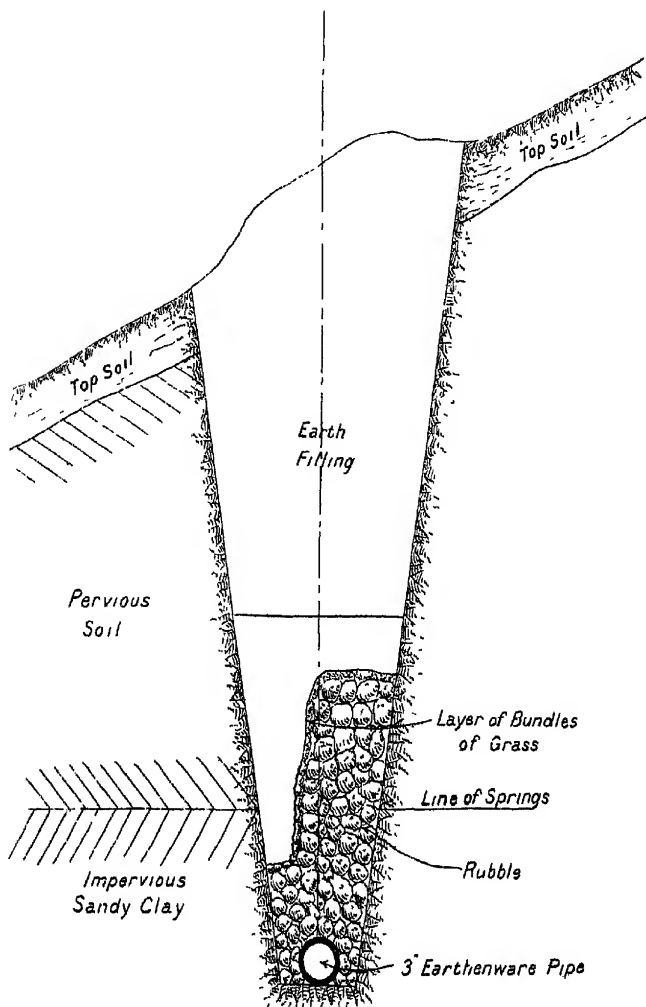
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"Drainage was the prominent feature of the work, in order to eliminate breeding places. Ditches were dug or improved, new channels cut and old channels cleared of brush and drift, all this being supplemented by oiling. Some of the heaviest work was on Patton's Island. Conditions there before and after drainage are shown in the accompanying views. A canal built to carry waste water from Plant 2 to the river provides drainage for a swampy area, and a lateral from this intercepts part of the flow of Pond Creek. Vertical drainage by natural sink holes and vertical shafts was a feature of the work. Two sink holes forming the only natural outlet of Pond Creek were enlarged, a timber crib 10 feet square and 30 feet deep being sunk in one of these."

The "Engineering News-Record" of April 10, 1919, in giving this information, furnishes an illustration showing a pond of 40 acres, as it was before and after drainage by means of a 41-foot vertical shaft. The area drained now forms "business lots."

TYPE SECTION OF CONTROL DRAIN

Diagram of Section of Pipe and Rubble Drain



N.B. "Line of Springs" indicates lowest level of sub-soil water lying superficial to impermeable clay.

TE: Joints to be Covered with

As no statistics were available of the former extent of malarial fever prevalence, it has not been possible to afford a statistical contrast, but it is stated that local physicians credit the works with effecting a 90 to 95 per cent. reduction, whilst local residents evince pleasure in the decided diminution of mosquitoes

ANTI-MALARIAL SUBSOIL DRAINAGE.

If an open ditch is trusted to for relief of surface soil in swamps, the chances of irregularities permitting the holding up of small quantities of water sufficing for breeding purposes of the mosquito can hardly be avoided. Moreover, as time progresses, silting, or breaking of edges under water-wear, result in a constant demand for repairs. The swamp at Kampala has long been the subject of remedial efforts. These have been devoted entirely to the use of "open ditches," with the result that the experience gained has been that it is "impossible with the available funds and labour to keep these open ditches adequately clear of vegetation; and in some of the low-lying portions of the swamp, the number of ditches necessary to drain the land, if laid on the most economical herring-bone plan has proved to be enormous." Consequently, Dr. BAKER suggested the use of sub-soil tile drains. Of the utility of this system when correctly adapted to the locality concerned, there can of course be no doubt. Not only has it the merit of getting rid of surface pools—otherwise than of temporary existence—and thus defying the mosquito, but once the expenditure of the original work has been met upkeep is of little consideration, especially if there be income from reclaimed land to balance against the expenditure. Mr. MILNER the Executive Engineer, Public Works, at Kampala, undertook the scheme.* Locally, after various experiments with clay mixtures, 3 inch unglazed drains were produced. Dr. Baker thus describes the work:—

"All round the edge of the swamp where the porous soil of the rising ground meets the impervious swamp clay, is a continuous chain of 'seepage holes' or springs.

"These 'seepage holes' were marked with flags, and a line chosen for the contour drain on the rising, more or less parallel to the seepage line.

"The strata met with in cutting the drain were:—

"(a) Top soil or humus about 6 inches deep.

"(b) One to four feet of red porous earth

"(c) The impervious sandy clay.

"Between (b) and (c) the subsoil water finds its way eventually to the seepage holes.

"After comparing the available literature on the subject describing the system adopted in Panama and the Malay States, it was decided to make use of rubble as well as pipes; constructing the drains as follows:—

"(1) Cut drain to line, and grade with a bottom of 9 inches in width and a side batter as steep as the nature of the soil permits; the invert being approximately one foot below the level of springs.

"(2) Lay the 3 inch tiles carefully in invert, the tiles being trued up to line, butt jointed, and the joints surrounded with puddled clay.†

"(3) Pack broken stone carefully around pipe until it is completely covered with 3 inches of stone.

"(4) Pack rubble 9 inches wide to a height of 9 inches above the level of springs, cover with grass, fill in trench with clay to a height of 6 inches above the rubble, and fill remainder of trench to the surface with any soil convenient

* Uganda Protectorate: Annual Medical and Sanitary Report p. 44.

† Italics not in the original.

"(5) Drains to be laid in straight lines between points which can be located by pockets in which the rubble is filled to the surface.

"Outlets to the pipe drain were arranged about every 250 feet or so, varying according to the position of existing drains (such as roadside drains), or at the best points for making connecting drains with the main channel.

"848 lineal feet of drain were completed as above, which soon had a marked influence on the portion of the swamp concerned.

"To demonstrate the actual result, the water collected in the pipe was gauged at the outlets.

"On July 31st, after an exceptionally dry month (rainfall only .22 inch), the reading showed that the water collected in these 848 feet of pipe amounted to a flow of 18.85 gallons per minute, or 24,264 gallons in 24 hours. It will be seen that this large volume of water is thus rapidly and effectively carried to the main channel which otherwise would have to be dealt with by means of numerous small open surface drains.

"Subsequent gaugings have shown that the water collected in the pipes is not much affected by rainy weather and the flow is more or less constant." (pp. 44-45)

[Engineering procedure cannot afford to be stereotyped; it necessarily varies designs with the exigencies of localities. The Engineer in charge of Works in this case therefore presumably had sound professional reasons for adopting the methods employed. With rubble apparently plentiful, Irish drains might possibly have served the purpose economically without the addition of tile-drains—though they certainly would have been of advantage; but to have directed that the joints of these tile drains be "covered with clay collar" was a most unusual procedure where subsoil drainage is concerned. That, in spite of this arrangement, the drains acted could only have resulted from the inefficiency of the collars so formed. What presumably would happen in such a case would be the travelling of the subsoil water guided by the rubble till at intervals it found a leak in the clay collars, when it would effect a delayed entrance into the pipes. The clay filling above the rubble would probably inhibit permeation of water derived from rainfall on the soil surface; and hence in dry weather the reported flow of 24,000 gallons per twenty-four hours in the collecting pipe of 800 feet in length, shows that the subsoil water has been duly tapped, but that the influence on surface water would be inconsiderable. Indeed, seeing that Kampala is dependent on wells for its water supply, it might be found by using a judiciously placed interception drain or infiltration gallery, that the despised subsoil water which is now forming an insanitary swamp, might be diverted to the more useful purpose of a public water supply.]

AGRICULTURE AND HYGIENE.

At a period when "miasma" floated in the breeze from irrigated fields and invaded dwellings to the detriment of the occupiers' spleens, it was evident it would have less chance of being released from the moist soil surcharged with changing organic matter, if the guilty area were covered with a continuous sheet of water. It was also recognized that if this were interrupted in continuity, so as to form here and there mere puddles, it became ineffective, and the damp earth was again free to transpire poison. The writer, as others of the same period, took the air-borne germ of malaria on trust; but he found no difficulty in a widely irrigated area notorious for "fever" (by personal observation and compilation of local statistics) in concluding that

malaria was markedly less prevalent whilst the fields were covered with water, and that increase occurred during its incomplete disappearance. ROSS and LAVERAN relieved the sanitarian of the necessity for effort of imagination as to how the germ was raised from the earth, by dealing with demonstrable entities; the appreciation of the mode of action of the sheet of water used as an anti-malaria measure was altered, but the empirical observation of its advantage was confirmed.

To fit the modern interpretation of circumstances, it has been held that the abatement of malaria during the period of complete surface covering with water, is brought about by the washing out of mosquito larvae from puddles in soil irregularities; moreover, that should the beneficent water bear silt with it, these breeding haunts are abolished. According to this theory not only is political economy served by life-saving of producers, but the agriculturist benefits directly by material possessed of manurial qualities being delivered on his fields, without personal effort or expense.

These are the views of the optimist, and demand ideal conditions which can rarely exist in nature. To meet these it would be necessary to presuppose the land to be dealt with has a gradient towards a suitable point of discharge, so uniform and of such hardness that the flood water shall neither make new depressions nor irregular elevations, and that the silt shall be uniformly borne by the supplying stream from areas suffering denudation of soil of a quality acceptable to the agriculturist receiving it. Neither of these factors can be relied upon.* So long as the mere indent of a bullock's hoof will contain enough water for a period sufficient for the breeding of mosquitoes, a silt-laden flood may flush from a site thousands of larvae, and yet may not be so omniscient as to fill up permanently each little puddle within, say, a one mile zone.

Practical experience long since taught the Italians when reclaiming land by silting that grading is essential, and that not an instant cessation of malaria can be expected. Indeed, whether the water be silt-laden or clear, analogous results are produced; unless special measures as to control of water when passing on the land, and drainage to remove it from the land when it has fulfilled its function, be pre-arranged. Confirmatory evidence of these views is forthcoming in the Report of the Medical Officer of Health, Khartoum, for 1918. His Report for 1917 showed that he had to deal with a rise of the Nile, which was the highest experienced since the occupation; his anti-malarial measures in dealing with newly-formed pools locally were prompt and were undoubtedly of advantage locally. But it was not possible for him to deal with areas beyond Khartoum. He states that "enormous districts were flooded and there were many square miles under water near to Khartoum, the most dangerous parts being cultivated land covered with growing crops." As to the effects of irrigation he makes the following statement:—

"Nearly every year has seen the formation of new pump irrigated farms to the North and now an almost continuous line stretches from

* This *Bulletin*, Vol. 4, No. 4 (Sanitation Number), August 15, 1914, p. 194.

Khartoum to Gedi, a distance of some thirty miles. Owing to lack of staff and also to the small fines given for neglect of anti-malarial steps, these farms have been insufficiently supervised and controlled. I visited these farms and reported on these. Some were good, some indifferent and others were in an appalling condition; the people living in the village adjacent to one farm showed 100 per cent. acute and chronic malarias, as shown from the histories and splenic index of 100 per cent. Other incidences varied from 53 to 73 per cent." Yet Nile water does not lack silt.

The following extracts from the Report for the year 1917, by Col. H. HENDLEY, Chief Malaria Medical Officer, Punjab, testify to the probable flushing out influence of a flood, but make apparent the after effects.—

"Thus it appears that the monsoon was unusually heavy, with excessive but not a continuous rainfall, and that the humidity was distinctly high during the autumnal months of the year. These factors provided climatic conditions favourable to the prevalence of malaria in an epidemic form. It was the heavy rainfall late in October more marked in the eastern districts, which probably minimized the severity of the epidemic of malaria in this part of the Province; in the district of Gurgaon, however, it had the contrary effect as it caused the flooding of the country: while being so much further south there was little relative reduction of temperature. In the eastern districts too there was no general flooding from the Rivers; so except in some localities where drainage was inefficient, as in the Amritsar District, the water flowed off rapidly taking with it no doubt innumerable quantities of anopheline larvae.

"To the west and south-west this late fall of rain had much the same effects as in Gurgaon—it caused local flooding which lasted for a long time, but it was not sufficient to cause any marked fall in the temperature with the result that there was a late and very severe epidemic of malaria."

"It is worthy of remark that the first four of the Districts are newly irrigated whilst the last three are served by inundation canals, or are liable to be visited by floods connected with the Indus or Chenab."

The districts specified by Col. H. Hendley as the "last three" are—Jhang, Multan, Muzaffargarh and Dera Ghazi Khan. On turning to the table supplied by him at p. 22 (Table XV), it is found that of 28 Districts for which the death rate from "fever" is given for the last quarter of 1917, these three afford the highest rate with the exception of Montgomery (92·33 per mille), namely, Multan, 88·04, Muzaffargarh, 88·42, and Dera Ghazi Khan, 80·55 *per mille*. Such figures certainly do not support the all-beneficent action of flooding.

But granted flooding and silting are not unmixed blessings when employed as anti-malaria measures, are they likely to satisfy the agriculturist's ambitions? To obtain cheap food for a population, is it necessary though regrettable that some morbidity and mortality be considered inevitable?

Regarded simply as stated—that is, flooding and silting without preconceived regulating measures, there is no reason to think, even if the risk of mortality be accepted, agricultural prosperity and cheap food need be forthcoming. On the opposite, silting under such circumstances will operate by staying that porosity of soil which is essential for soil aeration and nitrification requisite for plant growth.

In Gt. Britain, it was not the effort of the Sanitary Officer which practically eradicated malarial fevers. This was due to the meeting of agricultural necessities. Crops it was found would not grow.

water-logged soil: surface and more especially subsoil drainage preventing the subsoil water table rising beyond a defined height in reference to rootlets was pursued throughout the country—consonant with agricultural advance. Absence of water implied presence of air in the soil pores. Of the supreme importance of this latter condition to plant growth, it has been reserved to the Agricultural Department of India to testify after a series of experiments, extending through several years. The following reference to the conclusions arrived at is quoted from the Annual Report for 1917-18, of the Agricultural Research Institute, Pusa, (pp. 56 & 58) :—

“In the Quetta valley, the texture of the soil is such that after flooding, ventilation is very easily impeded with disastrous results to the crops. The investigation of this matter led to the recognition of the importance of soil aeration as a factor in crop production and in the working out of an improved system of irrigation which, if adopted generally in India, would bring in every year an additional revenue of £5,000,000—enough to pay the interest on the war loan. Now that the investigation of the various aspects of soil aeration has reached a stage when the results can be summed up with advantage and their practical application to Indian agriculture have become clear and definite, the present is a convenient opportunity for bringing together the various sides of this question and for emphasizing their importance in the future development of the country. . . . The existence of the soil aeration factor furnishes the explanation of the low yields of poor quality which always follows over-irrigation on silt-like soils. The texture of these soils deteriorates after being flooded with water. As the soil dries under the hot sun, the surface bakes into a hard crust largely impermeable to air. That the crust is impermeable can be seen by immersing in water a portion of the hardened soil after irrigation, the air escapes sideways and not through the surface skin. Each successive irrigation destroys the soil texture more and more and the surface crust becomes more and more impermeable to air. The effect of irrigation in alluvial soils therefore interferes with its ventilation. The process removes one limiting factor—the want of water, but it introduces another, namely, the need of aeration.”

In referring to results obtained in three different stations, the Report continues as follows :—

“One irrigation gave nearly ten maunds of wheat to the acre, two gave a little over sixteen, while three reduced the yield appreciably. These results prove that successful irrigation involves the working out of a practical compromise between the two conflicting factors—water and air. The aim of the irrigator is not mere application of water *but the provision of water in such a manner as to interfere as little as possible with the aeration of the soil*”

[This is precisely the compromise which the farmer has effected in Gt. Britain, and is that which is aimed at when the sanitarian in the tropics attempts to persuade the holders of the purse strings that anti-malarial works of a major character are not merely philanthropic—to be afforded the crumbs from the financial table (after the demands of all *remunerative* Departments of the State have been satisfied) but represent sound investments and the true interests of political economy.]

DYNAMITE IN ANTI-MALARIA DRAINAGE.

To break up stumps of trees, and as an aid to drainage where an impervious soil overlies a pervious, by means of dynamite explosions,
(C528)

has long been recognized as of possible utility in anti-malarial or other measures necessitating economy in clearing ground. But it certainly would not, at first sight, appear to be a promising method of overcoming the difficulty of removing mud. At the best, a general stir-up of a mass of mud would be expected—followed by an inglorious and persistent subsidence into its former condition. That this is not only not so but that in using dynamite financial economy can be secured, is shown by a Report by J. K. HOSKINS, Sanitary Engineer and W. E. HARDENBURG, Asst. Sanitary Engineer—both of the U. S. Public Health Service.* The following are extracts from their useful Report :—

"The best results were obtained in mucky areas where the mud was so deep and soft that hand excavation became slow and difficult. In these cases, the use of dynamite proved very satisfactory."

"With the aid of dynamite, one man accomplished nearly as much as six men using picks and shovels. The advantage of this, when labour is so badly needed, is obvious. The time saved by using explosives is also a valuable consideration in malarial control."

"The method of using the dynamite was as follows: After the surface had been cleared, two rows of dynamite, about 2 feet apart, were planted in holes from 3 to 4 feet deep, the holes being spaced from 18 to 20 inches apart. A detonating cap and fuse were then connected near the middle of the section planted, and, by concussion the whole area was exploded, excavating that section of the ditch in an instant."

"The only men employed in blasting ditch 60 were two negro dynamite men and a couple of labourers who carried the material to them. After the blasting was completed a small gang was put to work removing the debris and raking out occasional ridges left in the bed of the ditch."

"Another use to which dynamite was profitably put was in straightening out and deepening creek channels."

"Explosives were also used very extensively in removing stumps, etc., encountered in excavating smaller ditches. A stick or two of dynamite exploded under a stump will save several hours of labour."

ALGAE IN PUBLIC WATER SUPPLIES.

In face of the knowledge that the gathering grounds of a water-supply are open to gross contamination, the average population will contentedly defer action on financial or vested interest grounds for an indefinite period, provided the water is clear and tasteless; but a "fishy taste" in the same water due to the temporary presence of algae will suffice to cause a panic, and convince the same people that they possess incompetent sanitary authorities and that the matter must be remedied at any cost. Therefore, algae may not be without their use in water-supplies. They are, nevertheless, better avoided, as once introduced their vitality may be exhibited by seasonal recrudescence. Captain Robert H. CRAIG of the Sanitary Corps, U. S. Army (*Engineering News-Record*, April 17, 1919, p. 778) records an instance of their persistence in the water-supply of Fort Worth. The supply is drawn from a lake having a capacity of 40,000,000,000 gallons, an area of nine square miles, and a drainage area of 1,800 square miles. Samples of water taken within half a mile of the intake showed numerous micro-organisms, including diatomaceae, chlorophyceae,

* *Public Health Rep.*, 1918, Nov. 22, pp. 2052-2053.

cyanophyceae, protozoa, whilst tumblersful of water from the top of filters showed at times hundreds of crustaceans. Iron and lime is used as a coagulant and liquid chlorine as a disinfectant. After filtration, "the water often has a stronger taste than the raw water," and this is of the same character as that found in the lake—showing that the chlorine is not to be blamed. The taste entirely disappears after the autumn, and it seems to Captain Craig, therefore, to be entirely due to the algae; as handfuls of these growths have an odour corresponding to the taste noticeable in the water described as "fishy."

Some indication of the reason for algae developing so fully is found in Capt. Craig's statement:—

"It was the intention of the municipal authorities to clear the bed of the lake of the trees and underbrush, but not to strip the land, as the cost would have run into prohibitive expense. Some of the trees were removed but difficulty was experienced with the contractors, and the lake was filled without stripping and with little clearing. Thousands of trees were covered with water and many are partly submerged and partly exposed."

[Under these circumstances, it is presumed the Municipality were not surprised to find that the water of their impounding reservoir favoured the growth of algae. The use of copper sulphate in the proportion of lbs. 2 to lbs. 10 to a million gallons of water is generally attended with success—at least for a season—against algae; but, evidently, this instance has all the favouring features of an obstinate case. On one point of treatment for which, it so happens, the sanitarian is indebted to America (Massachusetts State Board of Health), the author of the paper does not give information, namely, whether the filtered water is stored in dark and covered reservoirs after filtration. This would seem essential in a water of this character if growth of algae even after filtration is to be prevented. Houston* got rid of the taste of water thus maltreated by algae by employing 2.5 to 5 lbs. of permanganate per million gallons. He, however, qualifies its success by stating that it can be effective in certain cases only. In the instance of the algae trouble of 1913 in London, this treatment was found to get rid of the taste "in a few minutes." He adds that the dose naturally varies with the oxidizability of the particular water.]

HOSPITAL SANITATION.

To secure for certain oriental races separation of sexes both during waiting for consultation of a Medical Officer and during examination in an out-patient dispensary, requires in planning the most strict economy as to space compatible with efficiency—in the interest of economy of the funds ordinarily available.

If it be remembered that merely a type building is specified of minimum dimensions and that this can be made subject to alteration as to size and interior details, it may fairly be said that the accompanying plan reasonably meets this end, as well as minimum sanitary requirements. It will be noted that no intimation is given as to drainage, or for facilities for floor cleansing in connection with this,

*Studies in Water Supply.—A. C. Houston.

nor of several necessary internal fittings; that the operation room (which is intended for minor operations only, such as may be dealt with in connection with an out-patient dispensary) is of the minimum feasible size, and that whilst, in the interest of economy, the window affords a good area for light it is not of a special character.

The plan is the design of E. Montague THOMAS, F.R.I.B.A., Consulting Architect to the Government of Madras, as approved and issued by the Sanitary Board of that Presidency.

The writer considers that medical officers in out-of-the-way places, who might consider a plan of this sort of utility for adoption in whole or modified, would find a decision as to cost—the determining factor—facilitated by his quoting not only the specification but the abstract of a detailed estimate; so that any local Engineer could from “rates” at his disposal at once supply an estimate of cost. As furnished with the Madras Sanitary Board Proceedings, they are as follows:—

General specification to accompany type-design for an out-patient dispensary.
Scale $1/8$ inch = 1 foot.

Foundations.—A depth of 3 feet is provided in the quantities, the lower 1 foot 6 inches being of concrete broken brick in lime mortar and the upper 1 foot 6 inches being country brick in lime mortar. The required depth and width of foundations will be settled locally according to the nature of soil.

Basement.—Country brick in lime mortar 2 feet high.

Superstructure.—All walls will be of country brick in lime mortar according to the thicknesses shown upon the drawing.

Stonework.—Bed stones under girders and trusses, bases of verandah posts, corbels to support verandah wall purlins and cills of doors will be of cut stone.

Wood-work.—The wood work will be of well-seasoned teakwood or any one of the timbers mentioned in Circular Memorandum No. 2040 C., dated 27th April 1909, may be used with an increase in the size of scantlings in case the timber to be used be applicable to Table No. II of Circular No. 234 C., dated 9th January 1908.

Doors and windows.—All doors and windows will be of teakwood according to the lettered description on the drawing.

Roofing.—Roofing over dispensary, operation, clinical laboratory, store and dark rooms will be of Madras terrace.

Roofing over other rooms and verandahs will be of Mangalore tiles over flat tiles including teak reepers.

Flooring.—The floors of all rooms and verandahs will be paved with Cuddapah slab over a levelling course of concrete 4 inches thick and pointed in cement.

Finishing.—The interior of Surgeon's, dressing, operation and clinical laboratory will be painted with Paripan or other suitable white glossy washable paint on a coat of Portland cement $\frac{1}{2}$ inch thick.

The interior of all other rooms, except the latrine will be plastered with two coats of lime mortar.

The interior of latrines will be plastered with Portland cement.

The exterior throughout will be plastered with two coats of lime mortar.

All doors and windows will be painted three coats of approved paint and the roof timbers painted two coats.

Cost.—The building shown on the drawing C.A. No. 32 of 1917 is estimated to cost at pre-war rates from Rs. 12,800 to Rs. 19,200 according to locality

D Windows

E Doors Br

F --- D° -

G Windows i

H Doors 1/3 i

I Steel Sash

J Doors Fixe

K Door with

L Window

M Door Pan

Abstract of detailed estimate for out-patients' dispensary —

Quantity.	Description of Work.	Rate.	Per	Amount.	Total.
7,846 c. ft.	Earthwork excavation for foundations .. ..	.	1,000 c. ft.	.	
4,717 "	Filling in basement with earth .. ..	.	" "	..
4,013 "	Concrete broken brick in lime mortar .. ..	.	100 c. ft	.	
4,754 "	Brick in lime mortar (foundations and basement) .. ..	.	100 "	.	
6,810 "	Brick in lime mortar super-structure .. ..	.	100 "	..	
235 "	Archwork brick in lime mortar .. ..	.	100 "	..	
153 r. ft	Band string course including plastering .. ..	.	R. ft.	..	
128 c. ft	Cuistone work .. ..	.	C. ft.	..	
1-01 ton.	Rolled steel joists including hoisting and setting .. ..	.	Ton.	..	
132 lb.	Wrought iron work .. ..	.	lb.	..	
587-42 c. ft.	Timber wrought and put up .. ..	.	C. ft.	.	
50 r. ft.	Wooden verandah hand rails including painting, etc., complete .. ..	.	R. ft.	..	
36 sq. ft.	Fixed venetianed louvres including painting, etc., complete .. ..	.	Sq. ft.	..	
96 "	Doors 1/3 panelled and 2/3 glazed with frames and iron fittings complete .. ..	..	"	..
256 "	Doors panelled with frames and iron fittings complete. .. ..	..	"	..
2 "	Doors braced and battened including frames and iron fittings complete .. ..	..	"	..
38 "	Doors (singleleaf) 1/3 panelled and 2/3 glazed with frames and iron fittings complete .. ..	..	"	..
90 "	Doors fixed with expanded metal including frames and iron fittings complete .. ..	..	"	..
90 "	Doors with expanded metal shutters and counters including frames and iron fittings complete .. ..	..	"	..
64 "	Doors panelled with counter including frames and iron fittings, etc., complete .. ..	..	"	..
70 "	Windows glazed pivoted top & bottom including frames and iron fittings complete. .. ..	..	"	..
24 "	Windows with frosted glass shutters including frames and iron fittings complete. .. ..	..	"	..
189 "	Windows glazed with frames and iron fittings complete. .. ..	..	"	..
72 "	Steel sash windows .. ..	..	"	..
997 "	Terrace roofing with brick on edge 3" concrete 3 courses of flat tiles top and bottom lime plastered .. ..	..	100 sq. ft.	..	

Quantity.	Description of Work	Rate.	Per	Amount.	Total.
4,801 sq. ft.	Roofing with Mangalore tiles imbedded in mortar over flat tiles including teak reapers complete		100 sq ft		
3,143 "	Levelling course of concrete 4" thick		"		
3,779 "	Paving with Cuddapah slabs 1½" thick over ½" lime mortar and pointing with cement		"		
4,029 "	Plastering with cement ½" thick and painting with paripan		"		
592 "	Plastering with Portland cement ½" thick		"		
9,152 "	Plastering with lime mortar two coats		"		
1,561 "	Painting three coats		"		
6,936 "	Painting two coats		"		
1 No.	Counters with necessary frames and fittings complete		Each		
310 sq. ft	Zinc sheet for valleys		S. ft.		
18 "	Honey comb brick work		100 sq. ft		
2 Nos.	Dispensing tables 10'-0" long 2'-6" wide with sinks		Each.		
175 sq. ft.	Polished Cuddapah slab shelves 1'-6" wide built in the wall		Sq. ft		
68 r. ft.	Boxing the rolled steel joists with expanded metal and cement		R ft.		
	Total ..				
	Contingencies at 5 per cent ..				
	Petty supervision at 2½ per cent.				
	Grand total ..				

LIFE OF VENTILATORS.

According to the *Engineering News-Record* (New York) of March 2nd, 1919 (p. 469), the Asst. Chief Inspector, Thomas J. CLAFFY, has just completed an exhaustive examination of the sewer and vent pipe systems of Chicago. Owing to steel pipes being cheaper than wrought or cast iron, the first named have been largely used of late years by builders. It was found that whilst wrought and cast iron vents more than 20 years old were destroyed to an extent of 20 to 25 per cent. the steel vents were 90 per cent. destroyed in the same period.

"On 101 galvanised steel vents 25 per cent. of the galvanising was destroyed; of 144 black steel vents all were 'scaling badly,' and the depreciation was estimated at 75 per cent. Of 28 wrought-iron vents, both black and galvanised were in 'good' condition, the black being estimated at 10 per cent. 'depreciation.' All of the 13 cast-iron vents were in 'good' condition, but with an estimated 10 per cent. 'depreciation.'

"Galvanising on the steel pipe appeared to be partly or wholly destroyed

before the pipe is 15 years old, the pipe as a result lasting from 15 to 25 years before complete destruction is observed. The relatively good condition of wrought iron, both black and galvanised, should again be noted, the 10 per cent given for both wrought iron and cast iron indicating a slight depreciation but no actual failures."

SEWAGE DISPOSAL.

For isolated houses and small institutions a favourite prescription for the overcoming of difficulties in respect to night-soil disposal, is the making of a septic tank. If the effluent be disposed of on suitably situated and cultivated soil, instead of into the nearest possible brook that may be employed by casual travellers for drinking purposes, a by no means undesirable solution of the problem is secured. But if in arranging for disposal a higher grade of purification can be brought about than by the use of the septic tank and equally economically, there should be no hesitation in preferring it. On such a task the Hygienic Laboratory of the United States Public Health Service has recently been engaged. Attention was confined purposely to sewage of the nature likely to be met with in ordinary dwellings and in small institutions. The work was carried out during 1914-1917-- under the supervision of Earle P. PHELPS, Professor of Chemistry, the Sanitary Engineer Officers being L. C. FRANK and D. P. RHYNUS.

From the general principles guiding sewage purification no marked departure has occurred, as a result of their investigations; their efforts have been directed towards a perfection of arrangements that will suit both sanitary and financial requirements, in treating the class of sewages likely to be met under the circumstances above indicated. They found reason to prefer the use of the Imhoff tank principle to the septic tank—that is to say, the accomplishing of sedimentation and subsequent digestion of the deposited sludge without the supernatant water being rendered septic before it reaches the sewage filter. After studying the action of aerobic filters of stone, they arrived at the conclusion that the Nasmith lath filter (*Journal Royal Sanitary Institute*, Vol. 37, 1916) best met the indication of presenting surfaces allowing of the flow of thin films in contact with air. This filter, as shown in fig. 1, is built up of ordinary laths, the laths of adjacent layers at right angles to one another, and those of each layer being parallel and spaced with clear openings of 3 inches. Closer spacing down to $\frac{3}{4}$ inch yielded less satisfactory results. The laths of each layer are also so spaced that they come over the centre of the open space in the second layer below.

There remained therefore the necessity for ascertaining the capacity of the plant to be employed, and for regulating the flow on to the filter after subjection to action by the Imhoff tank. Thus stated, the whole scheme of applying so complete arrangements for solitary houses or small institutions would adumbrate a "want of funds" by the holder of the purse strings. Their efforts have, however, yielded an obviously cheap and efficient arrangement.

It was reckoned that the period of detention varied between four and six hours, and that this gave an accumulation of 2 to 3 cubic feet per capita per annum. With the filter (Nasmith) depth of 6 feet, they obtained a high degree of purification, but $3\frac{1}{2}$ feet gave "an effluent sufficiently good to satisfy the requirements of most situations."

The "distributor" regulating the flow on the filter is a balanced basin which tips its contents on becoming nearly full. This rests on knife edges, which apparently prevents any jamming by accumulations. The attached figs. 1 to 4 are, with the following description, from the United States *Public Health Reports*, Vol. 34, No. 7, Feb. 14, 1919.

"Figure 1 gives the general lay-out which is considered most satisfactory and figure 4 gives the actual dimensions of this plant for a population of 10 people. For smaller populations some reduction in the size of the preliminary Imhoff tank is permissible, but the filter itself could hardly with advantage, be reduced in size. The general course of the sewage through the plant is plainly indicated. Entering from the main sewer it passes first into a grease trap, thence under the partition A-2, through the main sedimentation chamber, under partition A-3, through the wire

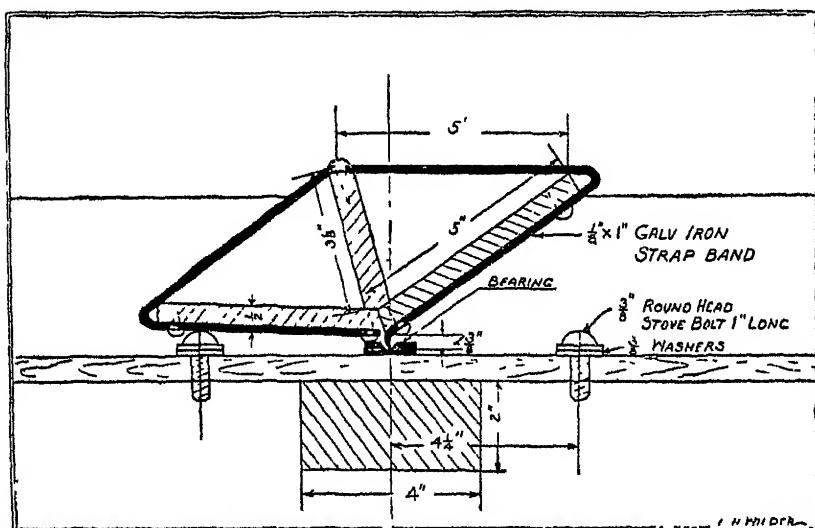


Fig. 3. Details of Sewage Distributor.

screen to the 2-inch outlet pipe which discharges directly into the sewage tipper. It is then distributed over the surface of the filter and flows through the filter to the tight table below, which fits the concrete structure snugly at all points except for the 2 by 24 inch space shown. Through this space it reaches the lower Imhoff tank similar in all respects to the preliminary tank except for the absence of partition baffles. Passing through this tank, it discharges at the effluent pipe D-3. During the passage of the sewage through the Imhoff tanks, the suspended solids are deposited upon the sloping partition from which they slide by gravity, ultimately reaching the lower or sludge compartment. Here digestion takes place, the gases and scum rising along the underside of the sloping partition to the vent chamber. Through this chamber the sludge is removed at necessary intervals.

"The plant will operate without nuisance, and, with a monthly inspection and semi-annual removal of sludge from the tanks, will operate continuously without further attention." (p. 276.)

Between the plant thus excogitated for houses and small institutions and that requisite for large towns, must be classed arrangements which will serve small communities where, although it may be possible to lay down a sewage system on borrowed capital, it would form a

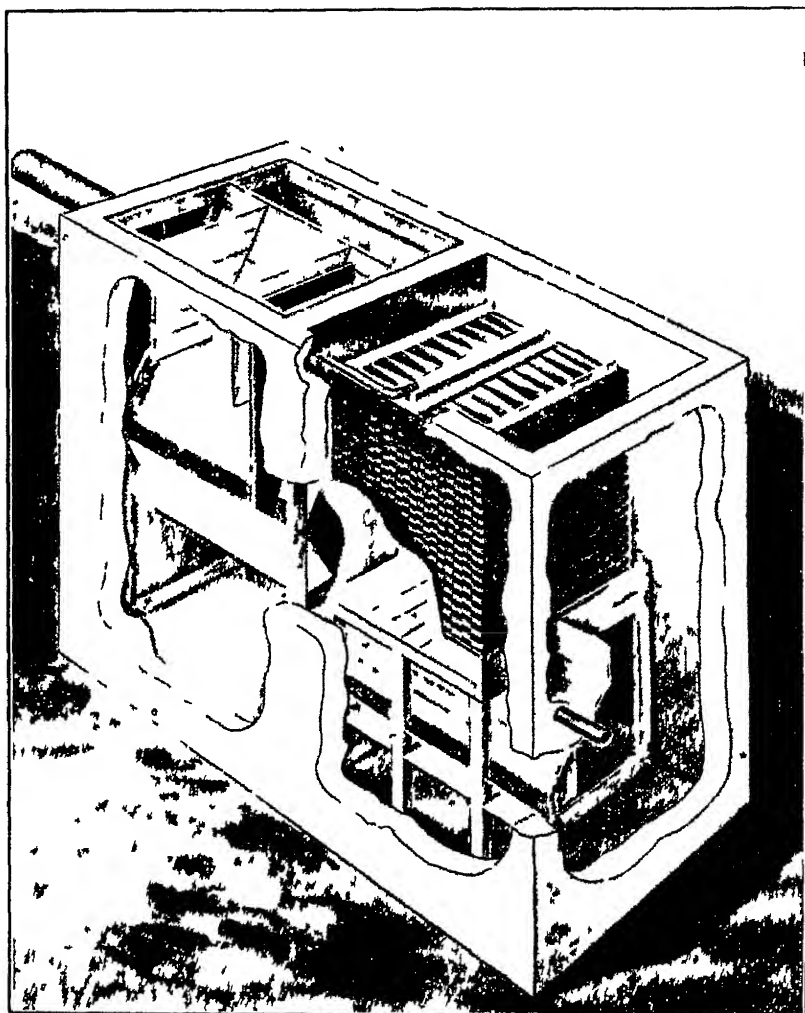


Fig 1 Imhoff tank and Nasmyth's lath filter

Figs 1-4 are reproduced by permission of the United States Public Health Service.]

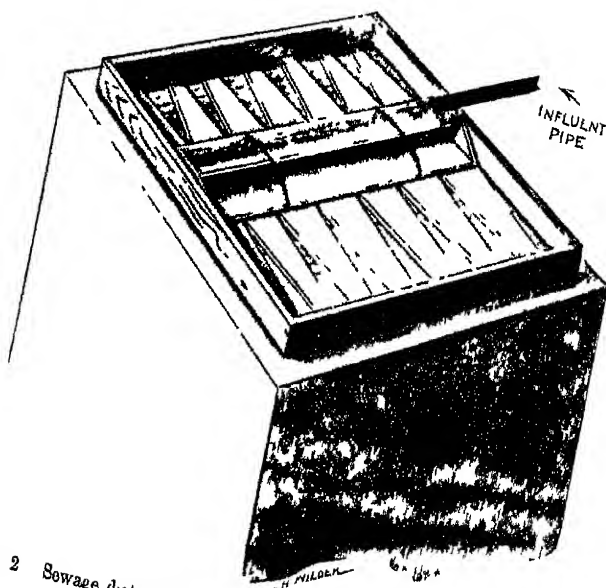
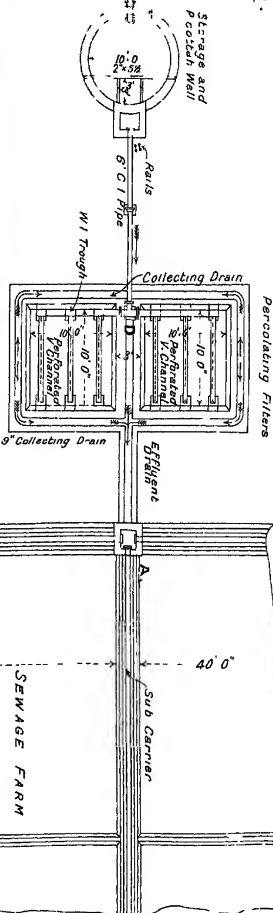


Fig 2 Sewage distributor, tipper and tray board, converging boards

Figure 3
DESIGN FOR
SEWAGE PURIFICATION ARRANGEMENTS
SCALE 1"=10'

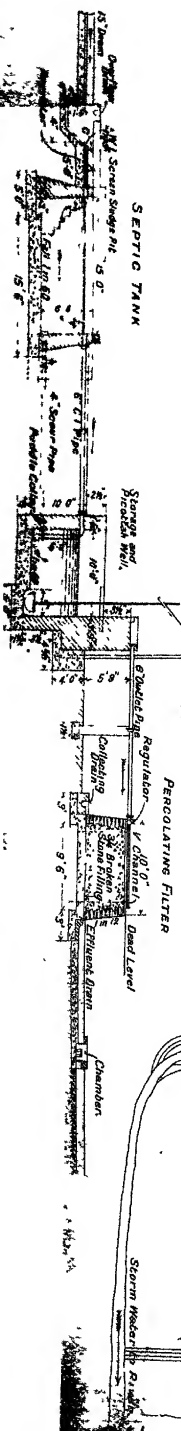
PLAN.

Over-Flow Channel



SECTION ON B B

SECTION ON A A



SEWAGE ENGINEER
J. H. HARRIS

difficulty to use machinery for lifting for disposal on land when, so far as arrival at the point for sewage purification plant it has been possible to trust to gravitation. Fig. 5 shows a type plan issued

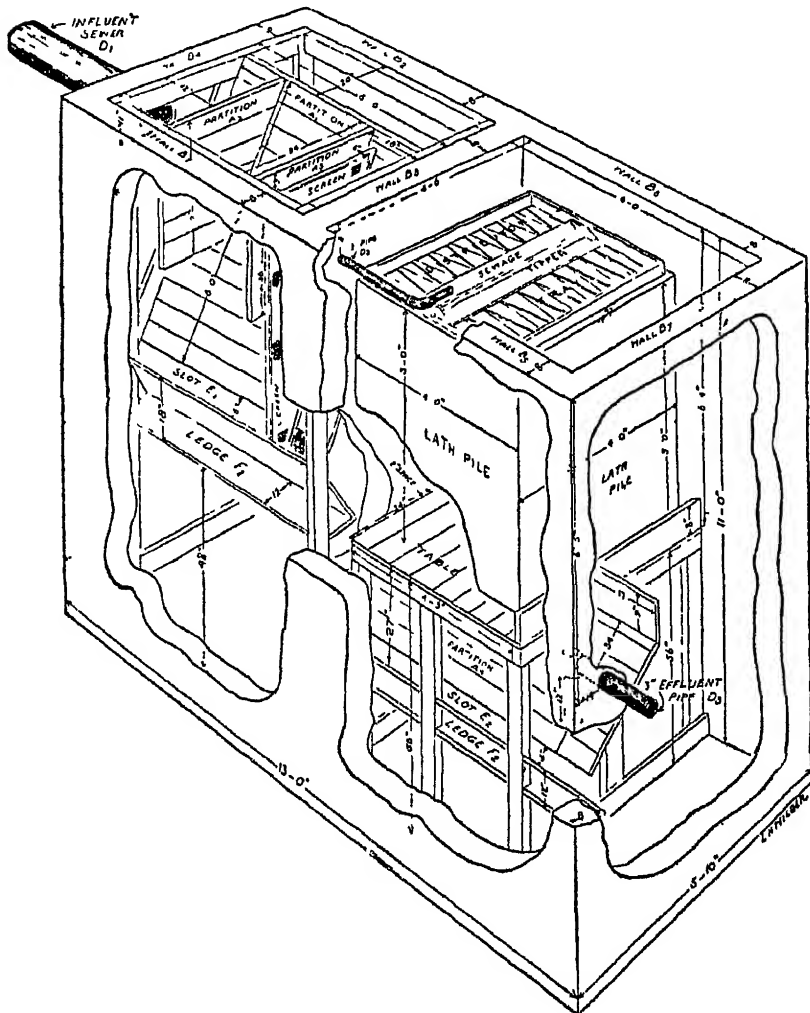


Fig. 4. Imhoff tank and lath filter: plant for 10 people.

by the Madras Government Sanitary Board, which meets economically this requirement. It will be seen that the lifting machinery (!) is man-worked—the familiar “picottah” or “shadouf.”

VITAL STATISTICS.

EGYPT UNDER WAR CONDITIONS.

Under war conditions, Egypt, in 1916 (Annual Report, Dept of Public Health, Egypt, 1916) exhibited an increased prevalence of infectious diseases, typhus fever cases which numbered 4,936 in 1913 amounted to 30,507 in 1916; relapsing fever increased from 342 in 1913 to 10,494 in 1916. The incidence of plague was not materially increased; in the five year period ending 1911, there were 1,656 cases, against 1,702 in the five year period ending 1916. After the battle of Romani, the troops occupied territory previously in possession of the Turks. During their pursuit, cholera cases occurred of which 15 were bacteriologically confirmed; of these two died.

"In September 1916 a small outbreak of para-cholera took place among the patients in a military convalescent hospital in Alexandria. It was apparently spread by a carrier from Mesopotamia. The military medical authorities have taken steps to collate the bacteriological results in this outbreak with those obtained from cases of the cholera group in Mesopotamia.

"The number of cases was from 60 to 70. No deaths occurred and there were no cases outside the hospital.

"The views of the Egyptian International Quarantine Board on this outbreak are set forth in the *procès-verbal* of their meeting held on December 5, 1916.

"The Department, believing that para-cholera is now a sufficiently defined class of disease has taken steps to have brought to the notice of the International Committee of Public Health, Paris, the question of the possibility of arriving at an accepted definition of the disease and of the international measures which will in future require to be taken in regard to this disease." (p 38.)

DEATH RATES IN EGYPTIAN TOWNS.

In a preceding Note, reference has been made to the re-organization of the Public Health Department of Egypt, as advised by a Commission appointed for its consideration. That this step on the part of the High Commissioner was desirable is evident from the following death rates for certain of the chief towns. From these results mortality amongst the military forces has been excluded:—

Rates per mille of population:—Cairo, 42·7; Alexandria, 40·3; Port Said, 48·3; Ismailia, 103·6; Tanta, 48·9; Giza, 43·8; Faiyum, 42·2; Minya, 63·6; Asyut, 49·9; Sohag, 46·0; Qena, 54·5; Aswan, 45·9.

The health of Egypt has an interest that is not merely local. It forms the great *insanitary* outpost between Europe and Asia, should be readily capable of reform and, when it has undergone this process, should prove an excellent sanitary "strong-point."

AUSTRALIA COMMONWEALTH.

The following is an extract from the Annual Report for 1917 (p. 7) of the Commissioner of Public Health, Western Australia, affording a

comparison of the death rates of the various States of the Commonwealth of Australia :—

		Death rate.	Infantile death rate.
New South Wales	..	9· 6	57· 6
Queensland	..	9· 63	54· 2
South Australia	.	10· 1	53· 68
Tasmania	..	8· 88	52· 7
Victoria	..	10· 9	11· 5
West Australia	..	9· 0	57· 7

SYPHILIS AND BIRTH RATES.

The birth rates of certain tribes are quoted by Dr. WIGGINS (Acting Principal Medical Officer) in the Annual Medical and Sanitary Report for the Protectorate of Uganda, 1917. The total population dealt with is 1,411,403. The rates for live births are :—Buganda, 13·29; Busoga, 43·54; Bunyoro, 15·83; Ankole, 23·22; Toro, 27·11. The natives of Bunyoro and Buganda here exhibit very small birth rates, but whilst, in the latter case, the “born dead” are 9·91 per cent. of the total births, in the case of the Bunyoro the “born dead” amount to 32·42 per cent. of the total small birth rate. Dr. Wiggins makes the following remarks on the subject :—“It is seen that in Bunyoro the births have dropped from 5,527 in 1913, to 1,680 in 1917 (and including still births from 7,559 to 2,486) and though a good deal of this may be put down to emigration yet this is not the only cause. The Bunyoro are a very poor race physically and syphilis is probably the chief cause of the small number of births and the large number of still births. *It is reported that inoculation with syphilis is still practised.*”*

JAIL HYGIENE.

The following death rates recorded for the City of Manila (*Report of the Philippine Health Service* for 1917) in a country which has exhibited itself open to plague, small-pox, cholera, and to diseases generally incidental to tropical conditions, are of interest in showing that the sanitary advance which has been in progress under American rule has not been spasmodic :—From 1907 to 1911, the rates per mille were 32·59, 47·62, 35·50, 34·25, 35·09, 33·35; from the latter year up to and including 1917, the rates were 24·48, 24·67, 25·54, 26·84, 25·03. The improvement thus shown is satisfactory as an instance of life-saving in a population of over 266,000. That population is free and of mixed nationalities, sexes and ages. Given, however, a section of the population usually not drawn from the (eugenically considered) better lives of a population subject also to possible incidence of diseases of the same nature as found in Manila, namely, the criminal classes—and restraining their free will to an extent to forbid many sanitary sins by placing them behind prison walls, it is found that tropical diseases no longer are invincible. In the Bilibid Prison, new arrivals died in 1917 at the rate of 8 per mille; old prisoners remaining in the prison died at the rate of 8·40 per mille. Residence within jail walls if continuous was therefore favourable to life; but a visit to their old homes on release followed by re-incarceration (as a result of further social lapses) brought about a mortality in this special class of 41·90.

* Italics not in original.

WAR-TIME BABIES.

A theory has frequently of late been set forth in the lay Press to the effect that, during the stress of war, male births exceed the normal ratio to female births. The matter would of course require a good deal of careful comparison of statistics, and enquiry as to how far the populations were affected by war psychology, before this theory could be accepted. Without this dissection of facts, the following para. from the Report of the Sanitary Commissioner for the Government of Bombay, for 1917 (Lt. Col F. H. G. HUTCHINSON, I.M.S.) at least exhibits a curious coincidence —In a population of 30,192 Europeans the calculated birth rate was 11.69 per mille "Of the 353 births, 184 were male and 169 female, against 164 and 160 in 1916; this represents a high proportion of male births—1,088 to 1,000."

A nursery rhyme suggest that in married life there is "first a girl and then a boy." The Report of the Philippine Health Service for 1917, does not bear this out in the following table. In it the preponderance of male to female births, as is the case in Gt. Britain, is also shown; indeed the difficulties the male undergoes at birth—plus his greater risk of death in the early stage of existence—would seem to warrant Nature's proportions:—

Births according to Number of Children borne by Mother.

Number of births in the order in which the child was born, whether first child, second child, etc.	Living			Stillborn.			Grand Total.
	Male.	F ^{male}	Total.	Male.	F ^{male}	Total.	
First . .	1,026	893	1,919	41	37	78	1,997
Second . .	800	716	1,516	26	18	44	1,560
Third . . .	692	652	1,344	19	11	30	1,374
Fourth . .	589	516	1,105	36	6	42	1,147
Fifth . . .	418	394	812	19	18	37	849
Sixth . . .	320	324	644	15	9	24	668
Seventh . .	247	231	478	15	9	24	502
Eighth . .	181	175	356	11	7	18	374
Ninth . . .	133	110	243	11	6	17	260
Tenth . . .	185	71	176	7	9	16	192
Eleventh . .	52	53	105	5	2	7	112
Twelfth . .	41	38	79	7	3	10	89
Thirteenth . .	24	23	47	1	2	3	50
Fourteenth . .	17	10	27	2	1	3	30
Fifteenth . .	6	7	13	4	..	4	17
Sixteenth . .	4	5	9	..	..	..	9
Seventeenth . .	3	1	4	1	..	1	5
Eighteenth . .	..	3	3	1	..	1	4
Nineteenth . .	..	2	2	..	..	..	2
Twentieth . .	..	..	..	..	..	..	..
Twenty-first . .	..	1	1	..	..	..	1
Total . .	4,658	4,225	8,883	221	138	359	9,242

TROPICAL DISEASES BUREAU.

TROPICAL DISEASES
BULLETIN.

Vol. 14.]

1919.

[No. 2.]

MALARIA.

HAUGHWOUT (Frank G.) **Endemic Malaria in the Philippine Islands as a Military Problem.**—*Philippine Jl. Sci.* Sec B. Trop. Med. 1918. Nov. Vol. 13. No. 6. pp. 287-308

The author descants on the dangers and hazards attendant on the extra-territorial employment of army units raised in malarious countries, and on the heavy responsibilities that this feature of war entails on medical officers. He expatiates on the necessity of a persevering anti-malarial regimen for such units, in order that all infective individuals may be persistently eliminated. It is an admirable summary of recently-published experience. Incidentally the author mentions that the idea of employing Roentgen irradiation of the spleen for the destruction of lurking parasites, which has been associated with the names of PAIS and DEUTSCH (1917) was promulgated by SKINNER and CARSON of the I M S. in 1911; also that his own proposal to use adrenalin in order to dislodge parasites from the internal capillaries has since been established practically. On the other hand he attributes J. D. THOMSON's clear-sighted criticism of the Schaudinn theory of parthenogenesis of gametocytes to J. G. THOMSON.

A. Alcock.

VAN BREEMEN (M. L.). **Malaria in Weltevreden and Batavia.** [Also in Dutch.]—*Meded. Burgerlij. Geneesk. Dienst in Nederl.-Indië.* 1919. No. 2. pp. 1-40. With 5 maps.

A very careful and interesting report on the endemic incidence of malaria in the adjunct municipalities of Batavia and Weltevreden, Batavia lying along the seaboard and being much intersected with brackish water and numerous fish-ponds, Weltevreden containing most of the European residences. The report and maps demonstrate that the puerital spleen-index is enormously higher in Batavia, being in certain Kampongs 100; and that both the general death-rate and its periodical increase in the malaria months (July-September) are highest in the districts having the highest spleen-indices.

Eleven species of *Anopheles* exist, of which only two—namely, *A. ludlowi* and *A. rossi* Giles—frequent houses. The larvae of both of these are found in immense numbers in the fishponds of Batavia, (C570); Wt. P7/3. 1,400. 8.19 B.&F., Ltd. Gp. 11/14.

A

and the adults of *A. ludlowi* are also found at considerable distances from their breeding-places. Of 3,813 individuals of *A. ludlowi* caught in houses 51, i.e., 1.3 per cent., and of 1,601 of *A. rossi* Giles 5, i.e., 0.3 per cent. were found with oocysts in the stomach wall. The author regards *A. ludlowi* as the formidable species.

A. A

SWELLENGREBEL (N. H.), SCHOFFNER (W.) & SWELLENGREBEL DE GRAAF (J. M. H.). *The Susceptibility of Anophelines to Malarial-Infection in Netherlands India.* [Also in Dutch]—*Meded. Burgerlijk. Geneesk. Dienst. in Nederl.-Indië* 1919. No. 3. pp 1-64. With 6 charts.

In their introductory remarks to these ample and laborious investigations the authors endorse the proposition that the potential danger of any given species of *Anopheles* experimentally ascertained to be susceptible to malarial infection depends upon the answers to the questions whether it is of common occurrence, whether it has a predilection for dwelling-houses and a natural preference for human blood, and whether it exhibits any biological peculiarities that affect either adversely or favourably its fostering of the malarial parasite.

Though the authors here record the results of an immense amount of experimental infection work, they think that in the survey of a malarious region the actual detection of naturally-infected individuals sets the danger seal on a species more firmly than can be done by inference from the laboratory.

The species *experimentally investigated* in the laboratory were *ludlowi*, *sinensis*, *umbrosus*, *barbirostris*, *punctulatus*, *kochi*, *albotaeniatus*, *indefinitus*, and *leucosphyrus*, and it was assumed that where the results of an experiment are negative no inference may be drawn unless the infected blood that furnished the feed contained upwards of 30 gametocytes per cubic millimetre—corresponding roughly, in the case of subtertian film where the gametocytes are unquestionable, to 1 crescent in a count of 200-300 leucocytes. Of the species mentioned only three were found resistant to experimental infection, namely, *albotaeniatus*, *indefinitus*, and *leucosphyrus*. *Ludlowi* was found hospitable to the subtertian parasite (100 per cent.), to the benign tertian (78 per cent.), and to the quartan (4.5 per cent.): *sinensis* to the subtertian (3.9 per cent.), benign tertian (28 per cent.), and quartan (0.8 per cent.): *punctulatus* to the subtertian only (4 per cent.): the three following to the benign tertian only—*umbrosus* (3.9 per cent.), *barbirostris* (10 per cent.), *kochi* (8 per cent.).

The authors observe that all the cysts of a given insect do not necessarily ripen at the same time even after a single infective feed. They also record an instance of an infected *sinensis* transmitting its infection in a momentary bite that did not draw blood.

In the search for *naturally-infected Anopheles* mosquitoes the authors ratify the axioms that the survey must be conducted in a confirmed endemic area and in the malaria season. They think it generally sufficient as a routine method to examine the stomach for oocysts; that it is impracticable, however advisable it may be, to pick and choose the females to be examined; that it is practically disadvantageous to ignore the evening catch of mosquitoes; and that

though 100 examinations may establish a criterion, this should be verified and corrected up to 700 or even 1,000 examinations if this can be done within the limits of a given season. They remark that benign tertian oocysts can be distinguished from those of subtertian by their finer and lighter pigment [see also ROUBAUD in this *Bulletin*, Vol 13, p. 64], that quartan oocysts are difficult to discriminate, and that oocysts having any unfamiliar features in the nature and distribution of the pigment should be treated with infinite statistical caution, as possibly they may not be human malaria at all.

To summarize the results of a series of assiduous surveys in different districts, we find here recorded the results of more than 17,000 examinations of individual *Anopheles* as follows :—

Number examined.	Species.	Number found naturally infected.	Percentage.
6204 ..	<i>ludlowi</i> ..	269 ..	4·34
714 ..	<i>rossi</i> ..	4 ..	0·56
2531 ..	<i>undefinitus</i> ..	1 ..	0·04
4580 ..	<i>sinensis</i> ..	6 ..	0·13
573 ..	<i>barburostris</i> ..	3 ..	0·53
657 ..	<i>fuliginosus</i> ..	2 ..	0·3
1391 ..	<i>punctulatus</i> ..	0 ..	0
540 ..	<i>koehi</i> ..		
1193 ..	<i>aconitus</i> ..		
34 ..	<i>maculatus</i> ..		
31 ..	<i>karwari</i> ..		

The authors remark upon the fact that *aconitus*, which STANTON and others have shown to be a natural carrier in other parts of the Oriental region, was not found naturally infected here, this being another illustration of the fact that any given species may not be infectible in every part of its range. They also note that *ludlowi*, which both their experiments and their observations of nature show to be the most dangerous species of the districts examined, will sometimes bite in the daytime.

Besides much that is of local interest the paper contains a great deal of judicious speculation and pregnant criticism.

A. A.

GOODALL (Alexander). *Malaria in Macedonia. A Clinical Lecture delivered in the Royal Infirmary.—Edinburgh Med Jl.* 1919. Mar. New Ser Vol. 22. No. 3. pp. 156–168. With 1 fig & 2 charts.

The author's experience embraces 20,000 cases and includes nearly every recorded species of complications. Among unusual phenomena of malarial derivation he has seen those of pernicious anaemia with numerous megaloblasts, a rash resembling that of typhus, a case with all the manifestations of locomotor ataxy except the Argyll-Robertson pupil, and a case of thyroiditis ending in an abscess which last, however, was not certainly malarial. Abstracts of five interesting cerebral cases are given. One of these was a case of delirium and coma where it was necessary to give 60 grains of quinine bihydrochloride in an hour, but with an excellent result. In another case of maniacal delirium with hallucinations, where parasites could not be detected, a committee

of experts in other branches gave the several diagnoses of G P I, Quinine-poisoning, and D T, but quinine in large doses intravenously, and afterwards continued *per os*, was effective. In another case, which had been diagnosed and treated as tetanus before admission and the subsequent detection of numerous subtertian parasites, the convulsions were stopped by quinine, but they subsequently returned and the case ended fatally. In another fatal case where cerebral symptoms and tetany were complicated with influenza and double pneumonia, the cerebral symptoms and twitchings yielded to quinine and death was due to pneumonia. In the author's experience the complication of cerebral malaria and pneumococcal pneumonia is almost certainly fatal, and in such cases the intravenous method of giving quinine is dangerous. The fifth case was characterised by an extraordinary sensibility to touch and pain all over the body: notwithstanding quinine in large doses the patient became delirious and almost comatose and *inter alia* showed Kernig's sign on both sides: for a long time he was tremulous and stupid, but he ultimately recovered.

The author states generally that most of the dangerous manifestations of malaria can be met by adequate quinine treatment, except those that seriously damage the heart.

A A

OESTERLIN (Ernst). *Erfahrungen in einem Malariaambulatorium in Durazzo.* [Experiences in a Malarial Dispensary at Durazzo, Albania.]—*Archiv f. Schiffs- u. Trop. Hyg.* 1919. Feb. Vol. 23. No. 4. pp. 68-72.

Between October 1917 and May 1918 the author examined the blood and spleens of the children in the schools. The blood index was 12 per cent. in October, and about half in February, when the spleen index was 40. Quartan formed a much larger proportion in this month than in October. Children with enlarged spleens were systematically dosed with small quantities of quinine, with intent to bring parasites into the blood. Of 60 so treated and the blood systematically searched during 3 months only two showed parasites. The malarial children were treated with quinine and arsenic, to their great benefit.

A. G. B.

BOUSFIELD (L.). *Malaria, with reference to (1) the Danger of Imported Anopheline Insects, (2) an Unusual Breeding Ground.*—*Trans. Soc. Trop. Med. & Hyg.* 1919. Jan. Vol. 12. No. 3. pp. 52-57. With 2 plans.

This careful paper affords good evidence that in Khartum the constant introduction, chiefly by river cargo-boats, but also by railway trains, not merely of fertile female Anopheles, but also of such insects potently infected with malaria, is an occurrence of serious importance.

The unusual breeding-ground described in the second part of the paper was one of the mud flats formed by deposit of silt after an inundation of the Blue Nile. Unlike neighbouring mud flats it did not harden at the surface, but remained of the consistency of thick pea-soup. A man of the mosquito-corps, trying to cross it, happened

to take up some of the mud in his dipper and found to his amazement that it contained anopheline larvae of different stages. This astonishing observation being duly verified, a section made at the periphery of the flat revealed the fact that two feet beneath the general sand-stratum on which it rested lay an isolated bed of rock which held up the sub-soil and soakage and kept the mud in a fluid state.

A. A.

ARMAND-DELILLE (P. F) *Note sur les caractères du paludisme primaire chez l'enfant.*—*Bull. Acad. Méd.* 1919. Apl. 1. Vol. 81. No. 13. pp. 395-397.

The author has noticed in Macedonia that most of the children in their 2nd and 3rd year, and many even in their first year, suffer from malaria. This malaria of childhood shows itself, in its primary stage, as a gastric derangement joined with fever, continuing, if not treated, for several weeks. Consequently, in places where malaria is endemic every child suffering from simple gastric derangement with fever should be examined for the malarial parasite. As the parasites are never abundant—probably because of the great activity of the macrophages of the youthful spleen—the search should be made in a thick film.

A. A.

PLEHN (A) *Zur Parasitologie, Klinik und Therapie der Malaria.*—*Munch. Med. Woch.* 1919. Feb. 7 & 14. Vol. 66. Nos. 6 & 7. pp. 146-149; pp. 185-188. With 3 charts.

A clinical lecture containing several observations of interest, chiefly concerning men who contracted infection in Macedonia in the summer of 1917; most were severe and obstinate cases. Attention is drawn to the marked fall in the blood pressure, not only during but also between the attacks, to which there was no exception. The maximum pressure was 80 to 90 mm. (Riva Rocci) and the minimum 50 or less. There were no symptoms of circulatory disturbance and the author points out that the low pressure relieves the heart. It suggests that fever is an anaphylactic phenomenon. To the same cause and the resulting overfilling of the splanchnic system is attributed the swelling of the spleen and liver, and the anaemia of the brain and consequent vomiting. Vomiting however was not a feature of these cases. The small size of the tertian parasites is commented on; in this respect they resembled quartan; usually only 6 to 8 merozoites were formed.

Appropos of a case of blackwater which is related the author says that the more action a drug has on the malaria parasites the greater the danger of blackwater, and suggests that the relatively slight tendency to blackwater fever in Macedonia was due to the resistance of the parasites to quinine.

The author is one of those who believe that the subtertian type of parasite may pass into the tertian type and published papers on this subject many years ago. He here relates at length a case in which, in his belief, the reverse took place. The patient, who had never been out of Germany except to Flanders, was admitted on March 12 with large tertian parasites and large round gametes and while under observation, for many weeks, both these and division forms were

frequently seen ; on May 29th crescents made their appearance and were seen daily up to June 4. No evidence could be obtained of contact with Colonial soldiers or prisoners. The author thinks that if this was a case of double infection one must suppose that the patient contracted his second infection in hospital in Berlin, perhaps by a flea or a *Culex* bite, from another patient. He himself regards the case as strong evidence of the correctness of his belief that the parasite can change its form.

In some remarks on treatment Plehn says* that he finds salvarsan to act on the full grown tertian parasites and gametes. Since the action of quinine is on the young forms we have an explanation of the success of these drugs in combination. Hypotheses of sensitisation of the parasites to quinine are unnecessary. When all signs of the disease have vanished and the patients have been 6 weeks without fever an attack may be precipitated by giving the patient a week's leave, especially if it implies a railway journey. Of 33 allowed home 24, either during or just after their leave, had relapses.

A. G. B.

MATKO (J.). Gedanken betreffs der Heilung und sozialen Fürsorgeaktion für die malarialranken Kriegsteilnehmer Deutschösterreichs.
[Treatment and State Provision for Malarial Discharged Soldiers of German Austria.]—*Wien. Klin. Woch.* 1919. Jan. 9. Vol. 32. No. 2. pp. 30-31.

The number of malaria infected Austrian soldiers is unknown but is reckoned at tens of thousands. The arrangements made for them appear to have been satisfactory during the war, but after the Armistice large numbers were precipitately demobilised without proper provision for their welfare, and much discontent and hardship has been the result. The author therefore in association with "the Central Committee of Malarial Patients" has drawn up a number of regulations for the care of malaria infected soldiers, which are here reproduced. They deal with notification of the infected, the erection and equipment of special hospitals, provision of quinine, popular instruction about the disease, sick-fund, admission to hospitals, blood examination, and disablement.

A. G. B.

SCHMALZ (W.). Ueber die Einschleppung von Geschlechtskrankheiten und Malaria durch unsere aus Russland heimkehrenden Gefangenen.
[The Introduction of Venereal Diseases and Malaria by Prisoners returning to Germany from Russia.]—*Deut. Med. Woch.* 1919. March 13. Vol. 45. No. 11. pp. 297-298.

The author was a prisoner of war in Russia for 2 years. In 1918 of 3,000 prisoners at a camp near Samara over 1,000 had malaria and no quinine was at the time obtainable. With underfeeding and the absence of quinine deaths were numerous ; how many is not stated. When quinine became available it cost 3 roubles the gramme. The author concludes that thousands of infected persons will eventually return to Germany.

A. G. B.

BORCHARDT (L.). *Entstehung und Verhütung der Rückfälle bei Malaria tertiana* [Origin and Prevention of Relapses in Tertian Malaria]—*Deut. Med. Woch.* 1919. Feb. 27. Vol. 45. No. 9. pp. 232-235.

This paper deals with the clinical phenomena of latent malaria, provocation methods after the course of treatment and the treatment itself. The author would employ provocative methods when there is any reason for belief that cure is incomplete. His method of treatment, of which details are given, does not call for notice because he merely states that the majority of his (tertian) patients recovered.

A. G. B.

SEYFARTH (Carl). *Umwandlung der Malariparasiten oder Mischinfektionen?* (Vorläufige Mitteilung.) [Transformation of Malarial Parasites or Mixed Infection.]—*Cent. f. Bakt.* I. Abt. Orig. 1919. March. Vol. 82. No. 7. pp. 564-570

This paper deals with the well-known fact of the seasonal appearance in South Eastern Europe of different types of malarial parasite, tertian in summer, subtertian in late summer and autumn, quartan in winter, with tertian relapses alone in spring, and the author lays claim to some knowledge of the subject after 2½ years in South East Bulgaria. He reaches the conclusion that the existence of three well-defined species cannot be denied, but that transitions [*Uebergänge*] may under certain conditions occur, one of these conditions being climatic.

As an argument against mixed infection he cites 220 cases of subtertian in which evidence of mixed infection was carefully sought in the autumn and winter and not found and which in the spring relapsed with tertian parasites.

Quartan was seen almost exclusively in the winter and chiefly in the severest winter of the three. Most of the patients had had subtertian or tertian in the preceding year.

The application to crescent carriers in spring of various provocative methods evoked the appearance of tertian parasites, and these were patients in whom no tertian gametes could be found. With the appearance of tertian rings and gametes the crescents gradually went. He points to the isolated occurrence of cases of quartan and subtertian infection, for instance in north west Germany, in places where tertian is the only form usually found. How do these species maintain themselves? He claims that the discussion has a practical bearing because tertian yields to quinine + salvarsan therapy and subtertian does not.

A. G. B.

LOWY (O.). *Ueber Monozytenvermehrung bei Malaria.* [Increase of Large Mononuclears in Malaria.]—*Münch. Med. Woch.* 1919. Feb. 21. Vol. 66. No. 8. pp. 210-211.

In 87 of 100 cases of tertian malaria the author found the large mononuclears to form over 10 per cent of the leucocytes (200 counted in a stained film). In 17 cases where malaria was suspected owing to

the high count of large mononuclears but parasites were not found they appeared after provocative injections,—milk and small doses of quinine (CORI).

A. G. B.

GROS (H.). *La conduite à tenir dans le paludisme.*—*Arch. Méd. et Pharm. Nav* 1919. Apl. Vol. 107. No. 4. pp. 241–261.

This paper contains nothing new. The author, however mentions that he has often observed, particularly in megalocytes, fine granules of chromatin, sometimes included in a vacuole, and has speculated on the possibility of these being the persistent forms of the malaria parasite.

A. A.

PAISSEAU (G.). *Malaria during the War.*—*Lancet*. 1919. May 3. pp. 749–751.

This is an interesting summary of the researches on malaria—clinical, pathological, prophylactic, and therapeutic which were published during 1916, 1917, and 1918 by medical officers of the French Army of Macedonia. Summaries of the original papers have already appeared in this Bulletin for the years specified, under the names of ABRAMI, CARNOT, DE BRUN, GUTMAN, HUTINEL, JEANSELME, LEMAITRE, MARCHOUX, MANAUD, PAISSEAU, POROT, RAVAUT, TRIBONDEAU, and others.

A. A.

JAMES (S. P.). *Malaria Contracted in England.*—*Trans. Soc. Trop. Med. & Hyg.* 1919. Jan. Vol. 12. No. 3. pp. 37–42

The interesting feature of these well-considered and well-digested investigations is the evidence—from tradition and from clinical and topical observation—of the persistence to the present day, in the estuarine tract of the Medway-Thames, of native nests of malaria; and that these played a contributory part in a recent epidemic of the disease in north-eastern Kent, quite independent of the exotic infection undoubtedly imported and communicated to the Forces and to the civil population by returned army convalescents from Eastern Europe. The native malaria seems not merely to have its local habitations, but to be focussed sometimes in particular streets, or even in particular houses; so that it is not improper to speak of "malarious houses" in Queenborough, Kent, just as one does—or did—in certain Indian cantonments, these particular houses being those most comfortable to the habits of the implicated mosquito (*A. maculipennis*).

Clinically the native British malaria seems to be remarkable for its mildness and its reluctant hold; some of the cases were so mild that they would not have been noticed but for a house to house survey; among 20 cases observed for at least a year 6 did not relapse, and the other 14 had a total of only 19 relapses.

In dealing with the disease among the civil population the measures relied on were detection and compulsory notification of individual infection; full quinine treatment and mosquito-net; and searching destruction of mosquitoes in patients' house.

A. A.

BASSETT-SMITH (P. W.). **Naval Cases of Malaria contracted in England, 1918.**—*Jl. Roy. Naval Med. Serv.* 1919. Apl. Vol. 5. No. 2. pp. 201-202.

The cases include 7 infections of men who had never been abroad, 2 of men who had been abroad but had never contracted fever before, and 6 relapses of autochthonous infection contracted the year before in the Isle of Grain.

Of the 9 new infections 1 occurred at Shotley, in Suffolk, no other cases being known of nearer than 20 miles, 1 occurred at Sheerness, 2 at Eastchurch, and 5 in the Isle of Grain where the naval M.O. in charge believes malaria to be endemic.

A. A.

MALONE (A. E.). **A Case of Malaria contracted in England.**—*Jl. Roy. Naval Med. Serv.* 1919. Apl. Vol. 5. No. 2. p. 202.

A case of simple tertian, in an officer of the Metropolitan Police employed in Pembroke Dockyard, who had never been out of Britain but had previously been stationed in Sheerness. The only species of *Anopheles* hitherto found at Pembroke are stated to be *A. bifurcatus* and *A. plumbeus*.

A. A.

PORAK. **L'oeuvre clinique de Maillot sur le paludisme.**—*Presse Méd.* 1919. Apl. 10. No. 21. pp. 245-250.

Biographers manage to recollect Maillot the vaudevillist, but the work of Maillot the military physician lies done and forgotten beneath our feet. He died in 1894, in his 91st year, but his observations on malaria began in Corsica early in the 19th century. Both as a clinician and as a therapist and also in no small degree as a sanitarian, Maillot was a whole age in advance of his time and almost abreast of the present day. He not only recognised all the different types of pernicious malaria with which we are now familiar, but he understood that malaria like tubercle and syphilis is a persistent disease of progressive stages, whose evolution must be arrested by particular treatment. At a time when cinchona had fallen into disrepute and to starve a fever patient was a cherished axiom, Maillot understood the proper use of that drug and the necessity of aliment in malaria cases. His sanitary policy in a terrible epidemic of malaria in Algiers in 1832 included the advocacy of good barracks, elevated sites distant from marsh, clearing, drainage, repair of aqueducts, and paving.

A. A.

MALIWA (Edmund). **Beiträge zur Kenntnis der Malaria. II. Mitteilung. Provokationsmethodik, Behandlung.**—*Wien. Klin. Woch.* 1919. Apl. 17. Vol. 32. No. 16. pp. 422-427.

The author finds that employment of the following mixture is superior to all the hitherto used provocation methods—Sodium chloride gm. 12, potassium iodide gm. 5, distilled water gm. 100. Of the freshly filtered and sterilised solution 10 cc. are injected intravenously. In about 1,600 injections there was slight phlebitis in two but no other

mishap. After such an injection the bone marrow and lymph apparatus show a very definite reaction, as a rule a polymorphonuclear leucocytosis, as in a true malarial attack, and other changes. The first injection is given 15-18 days after the commencement of the last attack of fever treated and, if no reaction occurs, after another 18 days it is repeated. If no reaction occurs after a corresponding period the case is regarded as cured; a third injection is unnecessary. In the first interval processes are taking place in the author's "regeneration" phase during which the parasites are not influenced. Quinine was not given when the temperature became sub-febrile as in these circumstances it proved useless, but when a genuine relapse was produced 1.5 to 2.0 gm were administered daily.

The author thinks that the provocative method should form the basis of treatment of every chronic malarial, and that the continuous saturation of the organism with quinine will thereby be avoided.

There is much theoretic matter in the paper, which is of interest but is not an easy one to read.

A. G. B.

SOHITTENHELM (A.) & SCHLECHT (H.). Ueber den Wert provokatorischer Adrenalininjektion bei latenter Malaria. [The Value of Provocative Injections of Adrenalin in Latent Malaria.]—*Munch Med. Woch.* 1918. Nov. 19. Vol. 65. No. 47. pp. 1307-1309. With 15 charts.

Impressed with the practical urgency of cases of latent and obscure malaria the authors made extensive trials with adrenalin injections. They point out that proof has been obtained that such injections cause the spleen to discharge blood cells into the circulation (FREY and OEHME) and refer to NEUSCHLOSZ's independent work on malaria [see this *Bulletin*, Vol 12, p 42]. The patient is kept under observation for 3-4 days with 4 hourly temperature takings and a daily blood examination (preferably in thick drop). If the result is negative 1 mgm. of adrenalin (suprarenin) is injected under the skin. The effect, when positive, is illustrated by 15 temperature charts. Fever may occur promptly or be delayed for 4 days, and the blood may become positive before or after the rise of temperature or without any rise. If neither reaction occurs in 6 days the injection is repeated. The authors say, without giving figures, that a positive result was obtained in a high percentage of cases of latent malaria, and highly recommend the method but admit that a negative result does not necessarily imply the absence of malarial infection.

A. G. B.

NOVAK (J.) & TOMAN (F.). Ueber Untersuchungen des Magensaftes bei Malaria-kranken. [The Gastric Juice in Malaria.]—*Wien. Klin. Woch.* 1919. Jan. 16. Vol. 32. No. 3. p. 66.

In their malaria patients the authors frequently noticed digestive troubles, such as loss of appetite, disinclination for meat, tendency to diarrhoea. They therefore systematically examined the gastric secretion and here report on the first 200 cases. They found that diarrhoea was often associated with deficiency of gastric secretion and

that achylia gastrica was common in cachectic patients. The teeth were in nearly all instances good. This condition of the stomach may be the cause of gastro-intestinal symptoms in malaria; they often vanished when HCl and suitable diet were given. The want of HCl and the diarrhoea may have a bad effect on quinine absorption, and the connection between this enquiry and so-called quinine resistance is obvious. In such patients there are advantages in the intravenous channel.

A. G. B.

RIEBOLD (Georg). *Komplikationen der Malaria von seiten des Gefäßapparates.* [Circulatory Complications of Malaria.]—*Munch. Med. Woch.* 1919. April 11. Vol. 66. No. 15. pp. 412-413.

The circulatory disturbances which the author has studied in a large series of cases are these.—

1. The considerable relaxation of the pulse and the fall of blood pressure; the blood pressure stands at 100 mm Hg or as low as 75. This condition was almost always present, in chronic as well as in acute infections. The author attributes it to the action of the malarial poison on the vaso-motors, which he considers to be almost specific and of value in diagnosis in doubtful cases. It is for this reason that malarial patients feel so weary and disinclined for exertion.

2. The acceleration of the pulse which is constant and long maintained. It usually comes on 3-4 weeks after an attack, and the rate reaches 90-120. It is not dependent on the patients' state nor on anaemia, but to a disturbance of the nervous regulating mechanism of the heart. It is not to be cured by digitalis nor by rest in bed. Consequently, if the heart muscle is not damaged and there is no high degree of anaemia, the patient should be got up and put to work, in the course of which the pulse rate gradually returns to the normal.

3. Severe implication of the heart is rare, unless it can be attributed to grave anaemia. Functional murmurs are not infrequent.

4. The kidneys are seldom affected.

5. Oedema, of the type of renal oedema, affecting the face and upper part of the body, is not rare. The urine is free from albumin, but there is anaemia, to which the condition is attributed. The general relaxation of the vascular system probably plays a part.

6. Thromboses in the lower extremity are attributed, jointly, to loss of vascular tone and anaemia.

A. G. B.

HEINEMANN (H.). *Ein Fall von durch Malaria bedingter Metritis und Perimetritis.* [A Case of Metritis and Perimetritis caused by Malaria?]—*Archiv f. Schiff's-u. Trop.-Hyg.* 1919. March. Vol. 23. No. 6. pp. 111-112.

A European woman of 40 in the Dutch Indies was taken ill suddenly with vomiting, severe abdominal pain, and retention of faeces with non-passage of wind. The uterus was much enlarged, was only slightly moveable and sensitive to pressure. The blood contained many tertian

parasites. The condition was diagnosed as acute metritis and perimetritis compressing the gut. Intramuscular quinine injections were given with surprising result, all the symptoms disappearing by the third day. The author expresses reserve on the point whether the malaria and the uterine condition were related.

A. G. B.

WARD (Gordon). **Malaria and Trench Fever.**—*Lancet*. 1919. Apl. 12. pp. 609–610. With 3 charts.

The author, considering the subject from the clinical side, thinks that there is a close resemblance, which does not seem to be appreciated generally, between malaria and trench fever.

A. A.

ROSS (Ronald). **The Care and Treatment of Cases of Malaria.**—*Lancet*. 1919. May 10. pp. 780–781.

“I.—In France

“During 1918 20 battalions of British troops, all more or less heavily infected with malaria, were transferred from Eastern fronts to France. On arrival in France from July onwards all these battalions were found to be too ill for the firing line and were therefore put into camps (generally canvas) within the same area, and were then subjected to a strict course of quinine combined with exercise, all under rigid discipline. The course lasted about ten weeks, and the result of it was so beneficial that when it was concluded all the units were able to enter the firing line, where they did distinguished work. The following are the

“*Details of the Course:*

“1 All the officers and men of every battalion, whether they were known to be infected with malaria or not, were subjected to the whole course

“2 The quinine was given daily on parade, if possible at 11 a.m. or at 2 p.m., under the supervision both of the regimental and of the medical officers and great care was taken that no one should escape his dose

“3. Either the sulphate or the hydrochloride of quinine was allowed; but these salts were always given in solution by the mouth.

“4 The whole course (lasting ten weeks) was divided into two stages. During the first stage, lasting 14 days, 15 gr. of either salt were given in solution every day. During the second stage (lasting eight weeks) 10 gr. of either salt were given in solution every day on six days in every week. Thus, every officer and man received 210 gr. during the first stage, and 480 gr. during the second stage of the course.

“5. *Physical exercises*, in the form of various kinds of military training, parades, route marches, fatigue duties, football, and other games, and even sea-bathing, were ordered or permitted during the whole course. But during the first stage no man was allowed to be employed on military duties (including ‘fatigues’) for more than four hours daily, and these four hours were not taken consecutively. As the course advanced, especially after 28 days, the daily number of the hours of work was increased, until, near the end of the course, full work was done, and the men even spent a night in the open without blankets as a final test of their fitness.

“6. All the malarious battalions were allowed the ‘forward area ration’—a very generous ration—during the whole course and bottled stout and French beer were often provided or permitted. But much tea was discouraged.

“7. Many of the men who had done 28 days of the course without relapses were allowed short leave to their homes, but were always given a supply of quinine tablets for 14 days with instructions to take 10 gr. daily without fail during their absence.

“8. Every endeavour was made to amuse and to interest the men during the course; and they were always instructed as to the reason why it was enforced so strictly.

"9. If, in spite of this antirelapse prophylaxis, some of the men did suffer from relapses they were admitted to field ambulances or detention hospitals, where they were at once examined by a medical officer and were treated accordingly. They were obliged to report the occurrence of the relapse immediately, at any hour of the day or night, and not merely to do so afterwards, as, for instance, next day. The relapse was treated as follows (unless there were medical reasons against the treatment) Ten gr of quinine in solution (hydrochloride or sulphate) were given every four hours until 40 gr. had been administered in the 24 hours; and this was continued for five days. If the man at the end of the five days had then been free from fever for two days, he was discharged to his unit with orders to recommence the whole course from the beginning. Special comforts were, of course, provided for men with relapses.

"10. Alkaline laxatives were administered twice or thrice a week to men on the ordinary course, and every morning to men suffering from relapses (unless contra-indicated).

"11. The following table shows the results of the treatment on the 20 battalions referred to:—

Table giving the Numbers of Cases Diagnosed as Malaria among 20 Battalions during the Ten Weeks' Treatment.

Battalions numbered serially.	Strength.	During week commencing first stage of treatment	During week ending first stage of treatment	During a week in second stage of treatment.	During week completing treatment.	Number of days under treatment.
I.	865	154	8	3	Nil.	67
II.	796	42	6	4	1	66
III.	765	209	78	57	2	66
IV.	706	21	20	6	Nil.	73
V.	701	175	82	62	"	88
VI.	954	573	79	10	"	70
VII.	626	80	11	1	"	87
VIII.	621	10	10	4	"	67
IX.	735	58	7	1	"	89
X.	721	20	16	1	"	66
XI.	—	80	60	1	"	46
XII.	—	87	15	3	"	72
XIII.	—	110	26	29	4	73
XIV.	—	175	95	67	3	60
XV.	—	146	102	19	5	90
XVI.	—	52	22	2	2	87
XVII.	—	140	13	69	Nil.	65
XVIII.	—	56	6	1	"	76
XIX.	—	50	32	35	4	56
XX.	—	82	8	Nil	11	74

Average duration of treatment 10 weeks.

"It should, of course, be understood that the battalions were not subject to infection or reinfection in France, and that the cases among them were therefore relapses. Few of the men were invalided out of the battalions after arrival in France.

"The details of the course were designed and superintended, under the the Director-General, Medical Services, B.E.F., France, by Lieutenant-Colonel J. Dalrymple, C.M.G., O.B.E., R.A.M.C.

"II. In England.

"During the last six months a number of soldiers previously infected with malaria have been undergoing special treatment in malaria concentration centres in the United Kingdom, with a view to rendering the men

as fit as possible either for return to duty or for demobilisation, as the case might be. The treatment adopted has been very similar to that given in France, as described in the previous Article 1. It consists in the daily oral administration of not less than 10 gr. either of the sulphate or of the hydrochloride of quinine, in solution to every man, without fail, on parade, in presence of the medical and other officers. The parades are generally held at 11 a.m. or 2 p.m., and the administration of the quinine must be continued daily for at least 28 days. Exercise in the form of drills, parades, route marches, and sports is insisted upon during the whole course for those who are fit for it. In the event of relapses occurring in spite of the course they are treated as described in Article I., which should be consulted for further details.

"The following table gives the results in two malaria concentration centres in which special daily figures have been kept on record. Of course the total strength in each centre varied from day to day as new cases arrived and men who had finished the month's course went away, but the first column of the table gives the average strength in the centre. The second column gives the total number of relapses which occurred during the month concerned, and the third column gives the percentage of relapses to the average strength.

"In Centre I, all the men have been given 15 gr. of quinine daily, and here the relapses until February have amounted to only about 1.6 per cent. of strength—that is, the relapses occurred only at the rate of 16 during the whole month among a force of 1,000 men taking the quinine course. In Centre II, the dosage of quinine was only 10 gr. daily, and the relapse-rate was higher. (The figure for November 1918, was rendered fallacious by influenza and other causes.) In Centre I, the relapse-rate was still higher during February, owing to many men being retained in the camp after the completion of the course.

Malaria Concentration Centre I.

(Captain H. Fraser, R.A.M.C.)

Month.	Average daily parade strength.	Relapses during month.	Percentage of relapses to average strength
November, 1918	918	15	1.63 %
December, "	423	7	1.65 %
January, 1919 ..	566	9	1.59 %
February, ,, ..	550	25	4.5 %

Malaria Concentration Centre II.

(Captain F. H. Cooke, R.A.M.C.)

November, 1918	493	69	13.99 %
December, "	376	10	2.65 %
January, 1919 ..	233	10	4.29 %
February, ,, ..	349	7	2.00 %

"The medical officers of both centres report that the relapses occurred chiefly among newcomers, who had not been taking quinine regularly before arriving at the centres: and they agree that the relapses were easily treated by the usual methods described in Article I."

A. A.

SYKES (J. H. K.). *The Treatment of Malaria—Two Methods and their Comparative Results.*—*Practitioner*. 1918. Dec. Vol 101. No. 6. pp. 346-347.

The treatments compared are (a) quinine in concurrence with pituitrin and (b) quinine in concurrence with adrenalin. Two groups of cases of relapsed malaria were put on the same careful regimen and the same general tonic treatment for a term of 3 weeks, receiving also during the 1st week gr. 20 of quinine sulphate daily 4 hours before an expected attack.

Group A (17 cases, 8 to 32 months' duration), received during the 2nd and 3rd weeks gr. 3 of quinine sulphate every 3 hours all the time and every fourth day a hypodermic injection of 0.5 c.c. of pituitrin.

Group B (16 cases, 10 to 25 months' duration), received during the 2nd week 17½ gr. quinine daily (½ in a single dose) and during the 3rd week 15 gr. quinine daily (½ in a single dose) and every fourth day m. 15 of adrenalin.

Arrangements were made to intimate—but not to ensure—that every case in both groups should have after-treatment of 60 gr. of quinine weekly for 3 months.

In Group A 12 cases (70 per cent.) relapsed within 3 months. In Group B 12 cases have concluded the 3 months' after-treatment, and of these only 3 (25 per cent.) have relapsed.

A. A.

KORNS (John H.). **Chronic Subtertian Malaria. Case with High Eosinophilia. Notes on Various Methods of Treatment.**—*China Med. J.* 1919 Jan Vol. 33 No. 1. pp. 14-17.

In this case, other well-known possible causes being excluded, the author was left with a residual alternative of malaria or quinine as the cause of the eosinophilia (which amounted to 60 per cent.) and he inclines to malaria.

In the treatment of the malaria galyi, by intravenous injection, had an immediate effect on the crescents and greatly improved the patient; but intravenous injection of tartar emetic, subsequently tried in the hope of finishing-off the crescents, seemed to have no effect.

A. A.

CASARES Y BESCAMZA (J. M.). [Treatment of Malaria by Special Technic.]—*Plus Ultra*. Madrid. 1918. Oct. Vol. 1. No. 4. p. 186. [Summarised in *Jl. Amer. Med. Assoc.* 1919. May 3.]

By this special method quinine (0.20 gramme) combined with arsenic is given in a large quantity of water at the beginning of the cold stage when the internal organs are hyperaemic and absorption from the stomach is rapid. As the cold passes into the hot stage the blood rushes to the skin, so that the copiously-absorbed quinine-water is diffused through the bloodvessels as effectually as if it had been injected, and moreover at the right moment for catching the young merozoites.

The originator of this ingenious method claims to have cured 897 out of 1,072 cases of malaria in a single course of 4 doses. 129 cases required a second course, and 46 a third, these being cases where the previous course or courses were not properly accomplished. The completeness of the cure was verified a year afterwards in 640 cases.

A. A.

NICOTRA (Antonio). **Le iniezioni endovenose di chinino nella Malaria.**—*Ann. Med. Nav. e Colon.* 1918. Nov.-Dec. Vol. 24. Nos. 5-6. pp. 889-895.

The author finds that one, two, or three intravenous injections of a gramme of quinine, administered during the febrile period, are capable

of curing all forms of primary malaria and many return cases of short, defervescence. He has thus treated 100 cases. The method has the advantage over others of admitting of immediate intervention in the first attack in which the patient presents himself, of rendering possible a direct attack on the parasite with a maximal dose of quinine and of causing the patient no pain and no serious constitutional disturbance. The quinine is dissolved in 10 cc physiological serum. A preliminary dose of adrenalin obviates unpleasant symptoms

J S Arnold.

SCHILLING. Ueber relativ chininresistente Malaria im cilicischen Taurus und Amamus. [Relatively Quinine Resistant Malaria in Cilicia]—*Deut. Med. Woch.* 1919. Apl. 24. Vol. 45 No. 17. pp. 463-464.

A paper called forth by that of FLEBBE [see this *Bulletin*, Vol. 13, p. 280] whose conclusions Schilling does not admit. He states that Flebbe failed to recognise an epidemic of malaria till he (Schilling) discovered its nature so that quinine prophylaxis was not commenced till August, its non-success was therefore not surprising. He points out that though quinine did not prevent malaria in Cilicia it delayed the attacks and prolonged the intervals between them. For the bitter tablets, which are disliked by the takers and hence avoided if possible, he would substitute tasteless gelatine capsules.

A. G. B.

KESTNER (Otto). Zur Frage der Chininprophylaxe. [Quinine Prophylaxis.]—*Archiv f. Schiffs-u. Trop.-Hyg.* 1919. Mch. Vol. 23. No. 6. pp. 104-110.

In Rumania in 1916 and 1917 the German Army received prophylactic quinine between April and the end of November, 0.3 gm. daily and 0.9 gm. on Sundays. It was noted that the larger dose caused deafness which made the men unfit for patrol work. The troops were in a swampy region on the Sereth river where *Anopheles* abounded; the inhabitants were left *in situ* and were malaria carriers in large proportion; it was very difficult to get quinine taken regularly as the men were seldom collected at one spot. A curve shows an abrupt rise in first malarial attacks in March and April, higher than the relapse rise at the same period. The course of these cases was not typical, gametes were found as well as schizonts in 680 cases and in nearly all instances the spleen was enlarged. They were in fact cases with a prolonged period of incubation or latency. This is attributed to quinine prophylaxis and the attribution is supported by figures showing the numbers of first attacks in summer 1917 and spring 1918 in two battalions, one of which was scattered and in association with "quinine-hungry" natives and the other concentrated and away from natives. In the first the spring attacks numbered 47, in the second in which the quinine was taken regularly 96 per cent.

A. G. B.

JAMIESON (T. H.) & LINDSAY (W. I.). **The Effects of Long Continued Dosage with Quinine on the Visual Apparatus.**—*Jl. Roy. Army Med. Corps.* 1919. *Apl.* Vol. 32. No. 4. pp. 295-301.

The authors were Medical Officer Malaria Section and Ophthalmologist of the 4th London General Hospital. They examined by methods which are described 170 cases of chronic malaria, under quinine treatment for varying periods; of these 145 had more quinine after admission to hospital and 25 had no more. Details of the fields of these cases are given. Ophthalmoscopic examination of the fundus of 106 of the cases showed perfectly normal fundi in 95. The colour vision was normal in all and none of them showed any central scotoma or central scotoma for colour; two showed typical malarial retinitis. The authors write:—

"Long continued treatment with quinine apparently has some effect in contracting the fields of vision, for twenty-two per cent. of our cases showed medium fields, and thirteen per cent. small fields. [Small fields are where the field is concentrically contracted to 20°] An improvement in the fields of vision of those who had no further quinine treatment was to be expected, but it is surprising to find that under further quinine treatment forty-five per cent. should show an increase in the field of vision, and only eight per cent. a decrease."

* * * * *

"Our experimental cases are few in number, but tend to show that in normal healthy men, large doses up to 90 grains of quinine hydrochloride daily for three days have not even a temporary effect on the fields of vision. Their fundi and fields of vision remained perfectly normal as did those of the men who were treated with single doses of 60 grains."

* * * * *

"Our investigations lead us to believe that no one need be deterred from giving moderate doses—10 to 15 grains three times a day—of any of the preparations of quinine we have used, by the fear of causing permanent damage to the eyes. Also that when the visual field is found to be contracted, either immediately on completion of a course of quinine or during its progress, the prognosis is good, and ultimate expansion of the fields of vision may be expected."

A. G. B.

NIERENSTEIN (M.). **Quitinine—A Disintegration Product of Quinine found in the Urine.**—*Jl. Roy. Army Med. Corps.* 1919. *Mch.* Vol. 32. No. 3. pp. 218-219.

Quitinine was shown by KERNER to be present in the urine after administration of quinine. Nierenstein confirms this, as far as the early stages of excretion are concerned. The method of its isolation and its characters are described and its reactions to the tests employed for quinine.

A. G. B.

DE JONG (S. I.). **Paludisme et réaction de Bordet-Wassermann.**—*Bull. et Mém. Soc. Méd. Hôp. de Paris.* 1919. Jan. 23. 3 Ser. Vol. 35. No. 1-2. pp. 3-4.

The author, from considerable experience, concludes that although in the active stage of malaria, as also in the paroxysms of other specific fevers, the normal haemolytic power of serum often is wanting, yet the specific critical significance of the Bordet-Wassermann reaction is not affected in the non-febrile phases of malaria.

A. A.

THOMSON (J. Gordon) & MILLS (Claude H.). An Investigation upon the Influence of Malaria on the Wassermann Reaction.—*Lancel.* 1919 May 10. pp. 782-785.

After a detailed historical review of the subject the authors are of opinion that the recorded observations of a positive Bordet-Wassermann reaction in malaria do not altogether satisfy scrutiny. Apart from any possible inaccuracies of technique, the hypothesis of undetected syphilis, acquired or congenital, has to be positively excluded, and the authors are far from satisfied with the record on this point. They themselves have examined, in every stage of the disease, 130 cases of malaria from different parts of the world; only in 8 of them was the B-W. reaction positive and in every one of these 8 there was either a history or some evidence of syphilitic infection.

A. A.

BRUG (S. L.) Les altérations des globules rouges, hôtes des parasites du paludisme.—*Bull. Soc. Path. Exot.* 1919 Feb. Vol. 12. No. 2. pp. 73-76. With 5 figs.

The author states that STEPHENS and CHRISTOPHERS' spots (here referred to by the later-bestowed appellation of Maurer's spots), which in films fixed with absolute alcohol or methyl alcohol are only to be seen in subtertian infections, can be seen also in benign tertian and (sometimes) in quartan infections if the films after drying are, without fixation, simply flooded for 15-30 minutes with a mixture of 1 part of the following alcoholic stain in 2 parts of distilled water.—(azur II. 40 mgm, eosin 25 mgm, methyl alcohol 25 cc.)—the parasites are not so well stained but the modifications of the red corpuscles are more evident.

By this same method also Schuffner's granules are as well seen in corpuscles containing young rings of the benign tertian parasite as in those containing the older forms.

A. A.

CORDIER (V.) La figure du sang dans le paludisme secondaire.—*C.R. Soc. Biol.* 1919. Apl. 5. Vol. 82. No. 10. pp. 355-357.

The author's observations refer to the "polynuclears." Where the majority of these have a nucleus of 3 or 4 distinctly-constricted segments he defines the condition as normal, and indistinctness and diminution, or distinctness and increase of the nuclear segments he defines as deviation to the left or right respectively.

From observation of 100 cases he finds that—except in very old infections, where no noteworthy modifications were seen—there is a deviation to the left from the 3rd to the 5th month after infection, returning to normal by the end of a year, the deviation being most pronounced in cases where relapses are frequent. In individual paroxysms a deviation to the left begins about 3 hours before the rigor, reaches its maximum at the rigor, and returns to normal by the tenth hour after, and then about the thirtieth hour there is a deviation to the right. In grave cases this effort at rapid regeneration of the "polynuclears" does not seem to occur. Quinine and iron and arsenic do not seem to influence the behaviour of the "polynuclears."

A. A.

LESIEUR (Ch.) & JACQUET (Paul). Sur une méthode de coloration élective du sang paludéen.—*C. R. Soc. Biol.* 1919. Mch. 22. Vol. 82. No. 8. pp. 267-269

Eosinate-azur (Poulenc) 1 gramme is dissolved in 200 cc of a medium composed of neutral glycerine 1 vol and absolute alcohol 9 vol, or of neutral glycerine 1 vol. and methyl alcohol 3 vol. The solution is left to ripen for 6 or 8 weeks, and is then filtered.

In use the stain is diluted with distilled water; but it should be added to the water drop by drop, without any attempt at mixing, and left to diffuse itself

The film to be stained should be fixed in absolute alcohol for 5 minutes, and placed, without any drying, in the diluted stain for 5 minutes

After staining the film should be rinsed quickly with distilled water and quickly dried.

A. A.

CRESPIN & ZAKY (Ali). Physiologie pathologique de l'accès palustre. Courbe de l'hémolyse et de la cholestérinémie.—*C. R. Soc. Biol.* 1919. Mch. 8. Vol. 82. No. 6. pp. 216-218.

The authors, dealing with 30 cases, have observed that the cholestérine in the blood falls below normal during the imminence of a malarial paroxysm, gradually rises to or even beyond normal during the paroxysm, and continues at normal if after the paroxysm the temperature remains normal; but that if the temperature does not immediately become normal the amount of cholestérine again falls. They therefore infer that cholestérinaemia is a defensive process in malaria as in certain other specific fevers; and they further suggest, as adjuvant to the specific treatment of malaria, the administration either of cholestérine or of organic substances such as adrenalin, that favor the endo-generation of cholestérine. They advocate generally the physico-chemical and humoral study of malaria.

A. A.

LAWSON (Mary R.). Migration of Parasites as the Cause of Anemia in Aestivo-Autumnal Malarial Infections.—*Jl. Experim. Med.* 1919. Apl. 1. Vol. 29. No. 4. pp. 361-368. With 2 plates.

The author asserts (a) that the anaemia of malaria is due to the fact that each parasite destroys several red blood corpuscles, (b) that deficiency of haemoglobin disproportionate to the loss of red corpuscles is due to the fact "that there is always a partial loss of haemoglobin in certain of the surviving corpuscles due to parasitic action," (c) that "migration" of parasites occurs in all aestivo-autumnal infections, and (d) that the many observers who have observed parasites free in the blood have failed to interpret their significance.

A. A.

SCHÖFFNER (W.), SWELLENGREBEL (N. H.), SWELLENGREBEL DE GRAFF (J. M. H.) & MOCHTAR (A.). On the Biology of *M. Ludlowi* in Sumatra. [Also in Dutch.]—*Meded. Burgerlijk. Geneesk. Dienst in Nederl.-Indië*. 1919. No. 3. pp. 65-88 With 10 plates.

Anopheles ludlowi has a very close resemblance both to *A. rossi* and to *A. indefinitus*, but can be distinguished from them by its speckled or marbled femora and tibiae. Its larva cannot be differentiated from that of *rossi*, but is distinguished from that of *indefinitus* by the length and position of the clypeal hairs. It appears to be susceptible to malarial infection in all parts of its range. In Sumatra (as in Java) it is essentially a domestic species, in that it stays in the house after it has had its feed: like the planter's guest it sleeps where it dines and it may prolong its stay for at least two days. It seems to have no great liking, or perhaps even an aversion, for the horse; but is attracted by cows and even more by buffaloes. Its bite is not painful, but it is "incredibly voracious," and will feed until it defaecates pure blood. Though formerly regarded as entirely a coast mosquito, the more so as non-tidal salt or brackish water was supposed to be essential to the existence of its larva, it is now known to occur far inland in Sumatra, where it has been found at a height of 700 metres above sea-level. In its inland haunts of that island it seems to breed almost exclusively in fish-ponds, and particularly in those where green algae are abundant. These fish-ponds are either valleys which have been dammed, or rice-fields which have been deepened, embanked, and filled from a stream; they vary in size from a few square metres to an acre or more, are shallow (1 to 1.20m.), and where possible have an outflow.

The authors have noticed that *A. ludlowi* is sometimes subject to sudden disappearances and re-appearances or to sudden increase, the cause of which cannot yet be explained.

The measures suggested for the extermination of this baneful species are destruction of the adults sheltering according to their wont in inhabited houses and buffalo-sheds, the use of the latter as traps, and the treatment of fish-ponds.

A. A.

MANGKORWINOTO (R. M. M.). Anophelines of West Java. [Also in Dutch.]—*Meded. Burgerlijk. Geneesk. Dienst in Nederl.-Indië*. 1919. No. 2. pp. 41-82. With 2 plates.

A valuable critical account containing specific diagnoses and also much information of practical importance regarding habits, habitat, &c. The following are the species found by the author in West Java in the course of a year:—1. *A. umbrosus*, 2. *barbirostris*, 3. *albotaeniatus*, 4. *sinensis*, 5. *fuliginosus*, 6. *jamesi*, 7. *schueffneri*, 8. *maculatus*, 9. *aconitus*, (*albirostris*), 10. *aconitus*, var *merak*, 11. *ludlowi*, 12. *rossi* Giles, 13. *indefinitus*, 14. *punctulatus*, 15. *leucosphyrus*, 16. *Kochi*, 17. *aikeni*.

The author has caught No. 2, 3, 4, 5, 9, 10, 11, 12, 13 indoors, but naturally infected individuals were found in only 2 species so caught, namely *A. aconitus* (= *albirostris*) 7.7 per cent and *ludlowi* 3.2 per cent. He has taken larvae of No. 1, 11, and 12 in salt and brackish water, and larvae of No. 14 in brackish water.

A. A.

DÖFLEIN (Franz) Weitere Mitteilungen über mazedonische Malaria-mücken. [Further Observation on Macedonian Mosquitoes.]—*Münch. Med. Woch.* 1918. Oct. 29. Vol. 65 No. 44. pp. 1214-1216.

According to the author *Anopheles bifurcatus* in Macedonia hibernates as larva, *A. maculipennis* and *superpictus* as adult female; these were often found in the winter in stables and other situations. *A. pseudopictus* was not found in Macedonia but occurs on the Danube in Rumania and Bulgaria. The larvae of *A. superpictus* were found as before reported [see this *Bulletin*, Vol. 11. p. 307] in running water in the gullies. The hind end is applied to the bank and the head projects into the moving water. If disturbed they leave go and secure another hold lower down. Such larvae cannot be treated by the ordinary methods. The author constructed stone dams in such a way that the bed could be flushed at frequent intervals, the rush of water sweeping away the larvae as each batch developed. Below the gorges the water sinks into the sand and the larvae succumb. He points out that the dams can be used also for the protection of roads and bridges, to provide power for mills, and so forth.

The author examined in the winter many hundreds of females in very malarious places with negative results.

A. G. B.

FÉRYTAUD (J.) & GENDRE (E). Sur la répartition des gîtes d'*Anopheles maculipennis* Hoffm. et d'*Anopheles bifurcatus* Meig.—*Bull. Soc. Path. Exot.* 1919. Apl. 9. Vol. 12 No. 4. pp. 178-182.

The authors have explored the breeding-grounds of *Anopheles maculipennis* and *bifurcatus* both in southwestern and eastern France, and here give the results of their surveys at some length. Their most general conclusion is that, normally, the larva of *maculipennis* is adapted to tepid water and that of *bifurcatus* to cool water. Typical breeding-grounds of *maculipennis* are stagnant pools, lagoons, marshes, edges of ponds and rivers exposed to the sun; but *bifurcatus* prefers the cooler and clearer water of springs, wells, and shaded tunnels. But in spite of these respective predilections the larvae of both species were sometimes found together in the same piece of water, though never in the stagnating ponds peculiarly affected by *maculipennis*.

A. A.

WILLIAMS (C. L.) Anti-Malaria Control Measures in Extra-Cantonment Zones.—*Southern Med. J.* 1919. Jan. Vol. 12. No. 1. pp. 22-28.

Within the boundaries of cantonments the control of malaria is left in military hands; this paper describes the measures adopted by the Public Health Service for dealing with malaria in the areas around the different cantonments. On the assumption that the ordinary flight of *Anopheles* does not exceed a mile, the breadth of the zone controlled is a mile.

After survey and the preparation of estimates, gangs of labourers with foremen and chief are appointed all under the command of a

sanitary engineer, and the necessary implements, supplies and transport are provided.

The first operation is clearing, deepening, and straightening of natural channels and watercourses, heavy work being done by teams of horses and mules and by dynamite.

Next, in hilly tracts, seepage ditches are made along and just above the line, at the foot of the slope, where the water naturally oozes, and these are connected with existing channels.

Then, if necessary, new channels are dug and connected with the main system of natural drainage.

Where water has collected below the level of any possible outlet a vertical drain may be bored to the underlying porous strata; this resort failing, the pond must be cleaned and oiled, or it may be filled in.

In dealing with a large swamp it often is not sufficient to clear and deepen the outflow channel; either a special outlet must be made and faced with logs; or a wide and deep channel must be cut right through the middle of it; or it may be necessary to divert the inlet into another channel. In the course of the work here described one diversion channel 3,500 feet long and 6 to 20 feet deep has been dug, and one straight cut through a swamp is 22 feet wide and 8 feet deep, and has been carried over 3 miles.

Large ponds and lakes are cleaned of all surface vegetation and reeds and other shore growth, and if not naturally well provided are stocked with small fish. Periodically lowering and raising the water-level keeps the shore clear of vegetation afterwards, or the edge may be boarded or concreted. If the sedge in a lake is too extensive to be removed by hand, a long thin flexible saw provided with sinkers is very useful. If fish are not plentiful enough booms must be anchored some distance from shore and the intervening water must be kept oiled.

The problem is very difficult in very flat country, particularly tidal swamp. Here the water must be as much as possible concentrated by the construction of wide shallow ditches, so that it can be controlled easily with oil.

Oiling is resorted to when everything in the way of draining off water has been done, and also for wells, springs, barrels, &c. where the water is not needed for drinking. The oil generally used is a mixture of two-thirds kerosene and one-third heavy black or crude oil. Drip-cans are used on running streams, the cans being suspended at one-third to half mile intervals and the corks adjusted for 60 to 120 drops per minute; the cans generally used run for about 48 hours and are filled once a week. For sluggish and stagnant water the "Panama Special Knapsack Sprayer" is used; if the channel is broad the sprayers work in pairs one man on each bank; every piece of water is oiled once a week. Oil is stored at stations distributed in the zone, and the men work from these stations. Oiling can only be successful if the water is kept free of weed and debris.

In some zones small patches of water have been poisoned by nitre-cake, a waste product of phosphate fertilizer factories. A very fine spray of commercial creosote is also very successful. But poisons are altogether too clever, for they are likely to kill all aquatic animal life.

As the work of control proceeds provision must be made for maintenance, patrol, and inspection. The whole area is therefore split into

sections, and to each section a maintenance gang is appointed under a foreman-inspector. For two days of the week the gang oils, and the rest of the week is appointed for repairs, clearing and improving.

In the 9 zones to which the statistical part of this paper refers 330 square miles of territory have been covered, 282 miles of natural channels have been cleaned and deepened, and 656 miles of new ditches dug, and the expenditure has been 430,626 dollars. The results are held to justify the expenditure most amply; the cases of malaria in camps in all the areas controlled probably do not exceed 100 in the aggregate and a large number of these were old infections.

It is believed that the results of this antimalaria work in the zones round cantonments will give an almighty impetus to the Public Health Service in public opinion throughout the malarious southern States of the Union.

A. A.

GEIGER (J. C.) PURDY (W. C.) & TARBETT (R. E.). **Effective Malaria Control in a Ricefield District. With Observations on Experimental Mosquito Flights.**—*Jl. Amer. Med. Assoc.* 1919. Mch. 22. Vol. 72. No. 12. pp. 844-847. With 1 fig.

The Report refers to Lonoke, a town of about 1,500 inhabitants, situated in a typical rice country with an impervious soil and little natural drainage.

In a rice growing district it is one of the necessary economic conditions that anopheline breeding-grounds must be; but all road-side ditches, and any swampy land etc. not used for rice can be cleared, drained, and periodically oiled, as in the present case, so as to reduce the inevitable breeding grounds to the lower limit. In such conditions screening of houses and careful management of the infected human individual play the chief part. Here, after a house to house survey, carefully-specified screening was enforced by order and effectively maintained by inspection; the screening included public buildings of every kind and purpose where people assemble after sundown, and no open-air assemblies were allowed. Human carriers were discovered by means of a general blood-survey, and every infected individual underwent a 30 day course of 10 grains of quinine daily, given preferably at bedtime, after which he was furnished with quinine sufficient for a continuation course of like duration. Not all the carriers were detected straight off; one came to light only after the second instalment of a typhoid vaccine, and another only after vaccination for smallpox: also active exercise, as well as fatigue, were found to influence the appearance of parasites in the peripheral circulation. In nineteen of the discovered carriers there was an absolutely clean malaria record of three years.

As a result of the antimalaria measures adopted malaria has been eliminated from Lonoke.

Experiments with stained mosquitoes (*A. quadrimaculatus*) were made on an extended scale to determine their powers of flight. About 4,000 stained individuals of this species were set free, of which only 10 were recaptured: of these 9 were recaptured at a station

$\frac{3}{4}$ of a mile distant from the starting point, and 1 at a station a mile distant. From observations of the same species systematically captured at definite points within a given area the authors assume that flights of 1.7 miles from breeding-ground took place.

A. A.

METZ (C. W.) Some Aspects of Malaria Control through Mosquito Eradication.—*Public Health Rep.* 1919. Jan. 31. Vol. 34. No. 5. pp. 167–183. With 4 figs.

This paper, dealing with malaria-control in improvised cantonments and munition factories mainly in the regions east of the Mississippi, contains many suggestive observations and ideas.

The three noxious local species of *Anopheles* are *quadrifasciatus*, *punctipennis*, and *crucians*, of which the first has a predilection for man, while the other two seem to prefer domestic animals and to take no delight in houses. *A. quadrifasciatus* prefers to breed in quiet and comparatively clean water ponds, swamps, lakes, etc.—though it may occasionally breed in troughs and other receptacles: *A. punctipennis* breeds in slow-running as well as in stagnant waters, but is not so fastidious for cleanness: *A. crucians*, though sometimes found breeding in company with the other two, often thrives in brackish waters or in water actually contaminated with chemical refuse.

The principles observed in dealing with these species were ditching, and drainage if possible, otherwise larvicides. Extensive swamps are the difficult things to deal with, though simple cleaning and oiling are sufficient in some cases.

Swamps fed by rainwater can generally be drained by ditching but swamps fed by constant seepage along a slope are individual problems to be tackled in each case by careful survey of outsoak. These lines must be followed throughout their course, so that the oozing water may be caught in drains all along the line, and so led away from and beyond the swamp, which then dries of itself or can be drained. Swamps due to springs in hollows, or to sluggish streams, may demand drainage operations of magnitude.

As a substitute for sprays and dripcans, bags of sawdust or swabs of cotton waste soaked in oil are useful makeshifts: they can be anchored short in the bed of a stream or ditch at suitable intervals, or the oily sawdust can be sprinkled loose on the surface. This sawdust soaked in oil is particularly suitable for filling in hoof-prints, ruts, and other such manifold small depressions in boggy land.

Dynamite is useful for making and clearing ditches: the "straight nitroglycerine" variety should be used. Horse-drawn ditching machines make ideal shallow V-shaped ditches in open land, and are the thing for cleaning out roadside ditches.

A. A.

MACDONALD (Angus). Antimalaria Measures in England.—*Brit. Med. J.* 1919. May 31. pp. 669–670.

This paper is published by permission of the War Office. The dangerous areas here recognised are Sheppey, Sandwich, Romney Marsh, and Essex. Under expert control provision is made for examination

of blood ; segregation, screening, and quinine treatment of individuals carrying infection ; instruction of medical officers ; entomological investigation. It is assumed as an axiom that for the prevention of malaria "the direct limitation of mosquitos is the only proven measure of practical value."

In the dangerous areas systematic destruction of *Anopheles maculipennis* wintering in farmsteads has been carried out. At Sandwich, in addition, more than 20 miles of "dykes" in the area of the camp have been trained and cleared of weed, and some notorious outlying waters have been treated : here the number of indigenous cases of malaria fell from 69 in 1917 to 6 in 1918, and the author appears to attribute this fall entirely to the results of operations against *Anopheles*.

A. A.

BASS (C. C.) Studies on Malaria Control. II. The Treatment of Malaria, with the Special Object of Disinfecting Infected Persons adopted after Wide Experience in Malaria Control by treating Malaria Carriers in the Mississippi Delta.—*Jl Amer. Med. Assoc.* 1919. Apl. 26. Vol 72. No. 17. pp. 1218-1219.

The author here gives in aphoristic form the results of a study of different methods of treatment of more than 25,000 malaria-infected persons in two Mississippi counties during three years 1916-1918, in forestallment of full reports.

The approved treatment for adults is 10 grains of quinine sulphate every night before going to bed for a term of 8 weeks (for children the dose descends in proportion to age, from 8 grains between 11-15 years down to $\frac{1}{2}$ grain under 1 year).

In case of a relapse the treatment is repeated for a term longer than 8 weeks, no credit being given for treatment antecedent to the relapse.

In acute attacks the approved treatment is 10 grains of quinine sulphate three times a day for 3 or 4 days.

The above course of treatment will disinfect more than 90 per cent. of cases. To disinfect 100 per cent. would take more than three months' treatment.

Quinine sulphate is as effective as any other salt, and is better than some ; its less solubility is no disadvantage, and occasionally is an advantage.

Except in rare pernicious cases, when intravenous injection is necessary, quinine should be given by mouth. Those who advocate either hypodermic or deep injection should try those treatments on themselves.

Quinine given every day disinfects more cases in a given length of time than intermittent treatment on one or two days of each week.

A. A.

RAWNSLEY (G. T.) ; GRAHAM (W. M.) ; NEWELL (A. G.). Prophylactic Use of Quinine in Malaria. (Correspondence).—*Brit. Med. Jl.* 1919. Apl. 19. p. 501 ; May 17. p. 626.

The matter of Rawnsley's letter has recently been noticed in some detail in this *Bulletin* (Vol. 13. No. 2. pp. 89-90). The writer of it

affirms, from his experience in Salonica, his belief that quinine in doses that can be tolerated has not any protective value to troops exposed to malarial infection under campaign conditions.

Graham approves of the theory that quinine acts not directly by destroying the malaria parasites, but indirectly by influential and subtle operations on the fabric of the blood.

Newell criticises RAWNSLEY's letter on the prophylactic use of quinine in Salonica. The writer objects that when quinine is not given every day infection may occur in the intervals; and again that when it is given every day it must not only be so continued for some weeks in the malarious area, but must be followed by some form of quinine treatment after removal from the possibility of infection.

A. A

- i. SERGEANT (Et.). A propos de *Pyretophorus chaudoyei*.—*Bull. Soc. Path. Exot.* 1919. Apl. 9. Vol. 12. No. 4. pp. 182-184.
- ii. GROS (H.). A propos d'*Anopheles chaudoyei*.—*Bull. Soc. Path. Exot.* 1919. Feb. Vol. 12. No. 2. pp. 53-54.
- iii. MONDOLFO (E.). [Primary Afebrile Malaria.] *Riforma Medica*—Naples. 1919. Mch 1. Vol. 35. No. 9. p. 165. [Summarised in *Jl. Amer. Assoc.* 1919 May 3.]
- iv. O'CONNELL (Mathew). The Rigor of Malarial Fever.—*Jl. Trop. Med. & Hyg.* 1919. Apl. 1. Vol. 22. No. 7. p. 55.
- v. JEANSELME (E.). Distribution of Soldiers, Temporarily Unfit through Malaria, in Agricultural Colonies.—*Lancet.* 1919 May 3. pp. 751-752.
- vi. MATHIEU. Note sur le paludisme.—*Arch. Méd. et Pharm. Nav.* 1919. May Vol. 107 No. 5 pp. 334-346
- vii. ALFORT (A. Cecil). The Treatment of Malaria.—*Jl. Roy. Army Med. Corps.* 1919. May Vol. 32. No. 5 pp. 352-360.
- viii. WILSON (A. Marius). Quinine and Malaria.—*S. African Med. Rec.* 1919. Mch. 8. Vol. 17. No. 5 pp. 73-74.
- ix. BRUCKNER (G.). 1. Malaria-Schnellfarbung. 2. Behelfs-Brutschrank.—*Deut. Med. Woch.* 1919. Jan. 23. Vol. 45 No. 4. pp. 101-102. With 2 figs.

i. "*Pyretophorus*" *chaudoyei* is one of those names that unfortunately has been a good deal bandied about among those susceptible species of *Anopheles* that closely resemble *A. turkhudi*. The author states that in his experience "*Pyretophorus*" *chaudoyei* is confined to the Sahara.

ii. Merely a note on the geographical distribution of this species.

iii. Report of a case, age 43, of grave anaemia without any history of fever, in which, after treatment for supposed nephritis, malignant tertian parasites were discovered in the blood. Under quinine recovery was soon complete.

iv. The author suggests that the rigor of malarial fever is due to a specific increase of water in the voluntary muscular tissue, and is analogous with the rigor experimentally induced by immersing a frog-muscle in normal saline, and with the rigor observed clinically in the operation of transfusion with normal saline.

v. The author's well-reasoned views on this subject were published in the *Bull. Acad. Méd.* for July 10, 1917, and have been noticed in this Bulletin, Vol. 11. pp. 30-31.

vi. There is nothing of categorical import in this discourse on malaria contracted at Dakar among the crews of convoys and controls plying between that port and Gibraltar.

vii. This paper recapitulates instructions issued to medical officers at Salonika for the treatment of cerebral and other pernicious forms of malaria.

viii. There is nothing new in this paper. It deals briefly with the clinical treatment of malaria—quinine in the active stage, iron and arsenic afterwards.

ix. Description of a method of staining malaria films that seems to correspond with the ordinary Leishman method, and a description and figure of a makeshift incubator.

A. A.

- i. AILBORN (Knud). Unerkannte Malaria als Komplikation bei anderen fieberhaften Erkrankungen [Unrecognised Malaria as Complication in other Febrile Diseases]—*Munch Med. Woch.* 1919. April 25. Vol. 66. No. 17. pp. 465-467.
- ii. OESTERLIN (Ernst). Erfahrungen über den mechanischen Schutz gegen Malaria. [Mechanical Protection against Malaria.]—*Archiv für Schiff's-u. Trop Hyg.* 1919. Feb. Vol. 23. No. 3. pp. 49-57. With 5 figs.
- iii. ARZT (Leopold). Ueber die Verbreitung der Malaria bei einzelnen Truppenkörpern in Südmacedonien. [The Distribution of Malaria in Individual Bodies of Troops in South Macedonia.] *Wien. klin. Woch.* 1919. Apl. 17. Vol. 32 No. 16. pp. 427-429. With 2 maps

i. A contribution to this well-worn but important subject, containing nothing unfamiliar to readers of the *Bulletin*

ii. A description of the mosquito proof huts devised by the author for the use of the troops at Durazzo to replace mosquito nets, which require the collaboration of the user.

iii. The title gives a sufficient account of this paper.

A. G. B.

AMOEBIASIS AND DYSENTERY.

MATTHEWS (J. R.) & SMITH (A. Malins). The Spread and Incidence of Intestinal Protozoal Infections in the Population of Great Britain. I. Civilians in the Liverpool Royal Infirmary. II. Army Recruits. III. Children—*Ann. Trop. Med. & Parasit.* 1919. Feb. 28. Vol. 12. No. 3-4. pp. 349-359; 361-369.

These papers contain an account of work done by the authors since the publication of their previous paper on protozoal infections indigenous in this country.

I. *Civilians in the Royal Infirmary*.—450 cases were examined once and the following percentages are given of the protozoal findings: *E. histolytica* 1·5, *E. coli* 6·7, *E. nana* 2·4, *Giardia intestinalis* 6·0, and *Chilomastix mesnili* 1·5. This shows that protozoal infections are not uncommon amongst the Liverpool general population.

II. *Army Recruits*.—For 1,098 cases examined the percentages were *E. histolytica* 5·6, *E. coli* 18·2, *E. nana* 5·5, *G. intestinalis* 7·0, and *C. mesnili* 2 cases. The authors are not able definitely to explain the reason for greater prevalence of infections among recruits than among the population; while mentioning the possibility of concentration in camps as being a possible factor, they are inclined to believe that age may have an important bearing on the incidence, infections being more frequent among the younger members of the race. This view gains weight on a consideration of results of the examinations of the children. It is now considered practically impossible to get reliable evidence of the pre-war incidence of infections in this country. Infected soldiers returning from different wars may have affected the incidence in Britain and stress is also laid on the part played by returning seafaring people, in this respect. It is stated that there may be occupational differences in the incidence.

III. *Children*.—548 Children, all under the age of 12 years, were examined once with percentages of positive findings as follows: *E. histolytica* 1·8, *E. coli* 11·1, *E. nana* 2·7, *G. intestinalis* 14·1, *C. mesnili* 1·8. For all children the infections were equally common in both sexes, though unequal in two age groups given. *Giardia intestinalis* was the most common parasite found and occurred more frequently than in the adult cases. Children were found infected with intestinal protozoa in the second year and from this onwards, but in 50 examined in the first year no infections were discovered. Examinations of the families of children infected with *E. histolytica* showed that within certain families infections are more common than amongst the general population.

These papers are very important and contain a large amount of new information on the subject of indigenous protozoal infections in this country. It is quite evident on reading this work that the infections are prevalent in most sections of the community.

F. W. O'Connor.

YORKE (Warrington). **Amoebic Dysentery in England.**—*Brit. Med. Jl.* 1919. Apl. 12. pp. 451-454.

The first part of this paper deals with the question of amoebic dysentery in England in view of the results of the investigations made by J. R. MATTHEWS and A. Malins SMITH. Papers by the authors on their findings have been published and the originals have been reviewed in this *Bulletin*.

The author emphasizes the importance of discovering whether the infection in this country is recent or otherwise, and he believes in the former possibility because (1) "Carriers" must frequently have entered this country before the war; (2) All the necessary factors for the spread of the infection are to be found in this country; (3) There are authentic records of cases of amoebic dysentery and liver abscess before 1914. Reasons are given for suggesting that some additional factor (at present unknown) is necessary before amoebic dysentery develops in individuals infected with the parasite. The necessity for having fresh specimens, in order to be sure of discovering the free vegetative forms of the parasite, in all cases is strongly urged.

The writer discusses the difficulty in diagnosing free forms of *E. histolytica* from free forms of *E. coli*, and he expresses as his view that there is no character by which the two can be differentiated: He says:—

"I would further lay down as a general guide that if entamoebae are found in numbers in the stools of a person suffering from acute or subacute dysentery the case should, for purposes of treatment, be regarded as one of amoebic dysentery. *E. coli* may be present in the stools at the beginning of an attack of bacillary dysentery, but as the dysentery continues they rapidly disappear."

[If stools are examined in the fresh state as recommended by the author the last statement can be hardly considered correct. Free *E. coli* have been frequently found on ten or more successive days in blood and mucous stools from which a specific dysenteric bacillus has been isolated and such cases have been cured without specific antiamoebic treatment.]

The writer observed ingestion of red blood corpuscles by *Amoeba limax* under certain cultural conditions and he considers it possible that experimentally *E. coli* under favourable conditions might also ingest red blood cells.

The efficacy of bismuth subnitrate, as recommended by DEEKS, is pointed out and details are given of the method of administration. Emetine Hydrochloride hypodermically is given at the same time.

F. W. O'C.

MACKINNON (Doris L.). **Notes on the Intestinal Protozoal Infections of 1,680 men Examined at the University War Hospital, Southampton.**—*Lancet.* 1918. Sept. 21. pp. 386-389.

During the investigation the stools of 1,549 cases were examined on six occasions within a week, 33, 5 times, 25, 4 times, 20, 3 times, 24 twice and 29 once within the same period. 447 of the men had been in tropical or sub-tropical countries. The numbers of cases examined with the positive findings of *E. histolytica* cysts are given in Table 1.

TABLE 1.

Examination.	No of cases actually examined.	Total number found infected with <i>E. histolytica</i> .	Percentage of total cases examined	Percentage of infected cases found by six examinations.
1st . . .	1680	72	4.3	34.6
2nd . . .	1651	103	6.1	49.5
3rd . . .	1627	127	7.5	61.0
4th . . .	1607	159	9.4	76.4
5th . . .	1582	184	10.9	88.4
6th . . .	1549	208	12.4	100.0

Of the 1,680 patients 864 or 51.4 per cent. were found to be infected with intestinal protozoa. Further analysis showed that infections were slightly higher in 914 convalescent dysenteries than in 766 cases admitted for other conditions; of the latter those with a past history of dysentery gave a higher percentage of infections than those without such a history.

1,233 patients had never been further abroad than Northern Italy; 34 had never been out of England. *E. histolytica* and *Trichomonas* infections were higher in the Eastern group than in the Western.

Of the dysenteric cases 280 who had visited the East showed 20.0 per cent infection with *E. histolytica*, while of those who had not been East only 10.0 per cent were found to be infected. *E. histolytica* was only found in one of the cases who had not been out of England.

The writer considers the sizes of *E. histolytica* cysts in 209 carriers:

103 cases had cysts below 10 μ only

90 " " above " "

16 " mixed infections with cysts of various sizes.

The treatment of carrier cases with emetine bismuth iodide is described. Patients were given three grain doses, daily, for 12 days and their stools were examined daily for 4 weeks following treatment.

"Of 131 men who received one treatment (130 for 12 days and 1 for 36 days) 62 were clear for 4 weeks afterwards and 69 relapsed. Of 16 men who had a second treatment (15 for 18 days and 1 for 24 days) 6 were clear for 4 weeks afterwards and 10 relapsed. Of 2 men who had a third treatment (for 18 days in one case with emetine injections during 10 days of the course) 2 were clear for 4 weeks after treatment and none relapsed."

The maintenance of a high number of examinations in the majority of the cases investigated adds considerably to the value of the writers' results. Her experience agrees with that of other workers who have found *E. histolytica* cysts after many negative examinations.

F. W. O'C.

FISCHER (Walther). *The Blood Picture in Amoebic Dysentery.*—*China Med. Jl.* 1919. Mch. Vol. 23 No. 2. pp. 108-112.

Differential blood counts were made in 30 selected cases of amoebic dysentery, the following precautions being taken to ensure accuracy:—

1. Only cases diagnosed microscopically as acute amoebic dysentery were considered.

2 All cases were excluded in which the disease was complicated by other disease or condition.

3. All cases were of a homogeneous class—male Chinese 20–40 years old.

4 Repeated examinations were made in most cases.

5. Blood films and counts were made by the same investigator throughout

The result of the examinations was as follows.—

	W.B.C.	Average.	Min	Max.
Neutrophiles ..	63·2%	43·5	81·5	
Lymphocytes ..	28·2%	11·7	48·2	
Eosinophiles ..	3·5%	—	19·0	
Large mononuclears and transitionals ..	% 5·1	2·8	8·2	

As a comparison a table showing results of examination of non-dysenteric Chinese is shown. In this the percentage of "Neutrophiles" is only 50 per cent. while both lymphocytes and eosinophiles are higher than in the first list.

Amongst the dysenteric series there was no marked change in the blood count after "cure". In some cases there were more "Neutrophiles" at the beginning than at the end, but in others the reverse was the case. In 4 cases the Eosinophiles were more numerous at the beginning. Sometimes these cells increased in number during the disease or cure.

The author concludes that there is no typical change of the blood picture in cases of amoebic dysentery nor during the course of the disease.

F. W. O'C.

ARMITAGE (F. L.). Amoebic Abscess of the Brain: with Notes on a Case following Amoebic Abscess of the Liver.—*Jl. Trop. Med. & Hyg.* 1919. Apr. 15. Vol. 22. No. 8. pp. 69–76.

The recent occurrence of a case of amoebic abscess of the liver and brain, observed by the author, led him to study the subject of amoebic abscess of the latter organ and to consider the literature of cases reported in the past. There is authentic evidence of 48 cases recorded from different parts of the world; most of the cases were from tropical or subtropical countries, 24 of the number occurred in Egypt; many were associated with or followed liver abscess.

The condition was most frequently observed between the ages of 20 and 40 but cases were reported in a child of 5 and an adult of 47 years. The majority of the patients were Europeans: only three cases occurred amongst females: none of the patients recovered. The abscess is described as being generally single and occurs with equal frequency on the right or left side. Bilateral abscesses were found on six occasions. In recent acute cases there is no limiting pyogenic membrane: in older cases there is a tendency to the formation of an abscess wall.

The differential diagnosis, from cerebral conditions complicating bacillary dysentery, metastatic abscesses, caseating tubercle of the brain, cerebral gumma and actinomycosis is discussed. The mode of transmission of the amoebae from an intestinal focus to the brain is

considered. It is pointed out that there are no distinctive signs of the condition and that clinical features "depend on localization and on susceptibility of the host." The disease is rapidly fatal, death generally taking place from the 6th to 8th day after the onset of headache. Treatment appears to have no effect on the course of the infection.

The histories of some of the more important cases recorded are included in the text. The paper concludes with a full account of the recent case noted clinically by Majors STOUT and FENWICK [see this *Bulletin*, Vol 12, p. 290]. In this case on post mortem examination an abscess the size of a pigeon's egg was found in the inner part of the left frontal lobe, extending into the ventricle. It contained thin yellow pus. There was a zone of softening round the abscess and localized basal meningitis was present in the area.

This interesting paper should be of value in the future as it contains important information based on a consideration of the previous observations made on one of the less common complications of amoebic infection.

F. W. O'C.

RAVAUT (P) & CHARPIN. Sur quelques faits en apparence paradoxaux susceptibles d'égarer le d'hépatite amibienne.—*Presse Méd.* 1919. Feb. 10. Vol. 27. No. 8. pp. 65-67. With 2 charts.

Following an account of the prevalence of amoebiasis amongst troops especially from Morocco and some indigenous cases in France, the authors consider hepatic abscess from most aspects. The possible absence of fever amongst clinical manifestations is emphasised. The failure to find *E. histolytica* cysts in some cases after repeated examinations is pointed out. Great reliance is placed in radiography in locating abscess and for noting hepatic enlargement. Exploratory puncture is advised where abscess is suspected. The following therapeutic measures are advised: 10 injections intravenously of Novarsenobenzol, the dose not to exceed 0.30 gm. every six days; between the first 4 injections emetine is injected during three consecutive days, in doses of 4, 6, and 8 centigrammes; emetine is suspended between the 4th and 7th injection of Novarsenobenzol. The patient receives in 40 days 10 arsenical injections and 18 injections of emetine.

F. W. O'C.

CROS & DE TEYSSIER. L'Émetine dans l'amibiase hépatique.—*Arch. Med. Pharm. Mèd.* 1918. July. Vol. 70. No. 1. p. 34.

Injections of four centigrammes of emetine per diem are recommended in amoebic infections of the liver. The injections are given in three series of six or seven days with intervals of from seven to ten days between each series.

F. W. O'C.

MATTHEWS (J. R.). A Mensurative Study of the Cysts of *Entamoeba coli*.—*Ann. Trop. Méd. & Parasit.* 1919. Feb. 28. Vol. 12. No. 3-4. pp. 259-272. With 4 figs.

Measurements of the cysts of *Entamoeba coli* were made from 27 cases infected with the parasite, with a view to determining whether

strains existed as they do in *Entamoeba histolytica*. As far as possible cases were chosen which were known to be infected in different geographical regions. 1,000 cysts were measured in some cases, 500 in others and not less than 100 in any individual case. Specimens for examination were mounted in saline, or in Weigert's iodine when *E. histolytica* was known to coexist with the *E. coli* infections. From analysis the writer believes that a reliable average can be obtained from the measurement of 500 cysts in each case. In the different groups recorded it is shown that the size of greatest frequency may be a little above or below the average size. Indication of the existence of three strains or races of *E. coli* was found from the examination; two of these are represented in two curves, "of the same form, unimodal and practically symmetrical." In the third, where there was probably a mixed infection with cysts belonging to 2 and 3 (see below), the curve was bimodal. The strains found are given thus:—

- | | | | | |
|----|----------------------------------|----------|--------------|------------------|
| 1. | With cysts of greatest frequency | 15 μ | average size | 15.3 μ |
| 2. | " " " | " | 18.75 μ | " " 18.5 μ |
| 3. | " " " | " | 21.7 μ | " " ? 21.5 μ |

It is pointed out that other strains though not yet proven may exist, but that strains producing cysts averaging 25 μ must be rare. The author found little change in the size of cysts examined from day to day. He recommends that in order to prove the constancy in size of cysts they should be examined in specimens from the same case at intervals for a considerable time.

F. W. O'C.

JOB (M. E.) & HIRTZMANN (M. L.). *L'évolution d'Amoeba dysenteriae et l'histo-pathogénie des abcès du foie.*—*Bull. et Mém. Soc. Méd. Hopit. de Paris*. 1918. Oct. 24. Ser. 3. Vol. 34. No. 28-29. pp. 928-929.

The authors believe that the young and small forms of the amoebae are mainly responsible for the pathogenicity of the parasite. They find Heidenhain's method unsatisfactory for demonstrating the cell changes and have used an aniline stain (to be described in a future publication).

By this stain in young amoebae the nucleus appears to be homogeneous, surrounded by a zone of protoplasm. These amoebae penetrate the hepatic cells and digest them, finally replacing them. As invasion of the tissue by amoebae progresses necrosis occurs in the centre of the area already attacked. The writers still assert that multiplication of these amoebae takes place by schizogony.

F. W. O'C.

CUTLER (D. Ward). *Observations on Entamoeba histolytica.*—*Parasitology*. 1919. Feb. Vol. 11. No. 2. pp. 127-146. With 1 plate and 1 text fig.

Observations on amoebae obtained by culture prepared by the author's own method (described in a former publication, see this *Bulletin*, Vol. 12, p. 292) and from cats experimentally infected are explained in this paper. The effects of chlorine, tyrosin and skatol on amoebae were observed; the first two substances in certain dilutions appeared to accelerate nuclear division and multiplication,

while skatol seemed to induce cyst formation. The author claims to have observed the various changes resulting in division of the parasites, and the mechanism of division of nucleus and protoplasm is described. Cyst formation and further development, the origin of chromatoid bodies in cysts, and the stages of degeneration in amoebae are also discussed. [Referring to cats experimentally infected with *E. histolytica* the writer alludes to cyst formation with chromatin extrusion being rare: further in the paper he says. "If Dale and Dobell mean by this statement that they found no evidence of cyst formation in cats, I am in entire agreement" These statements are not consistent]

F. W. O'C

ACTON (Hugh W.). **The Significance of Charcot-Leyden Crystals in the Faeces as an Indication of Amoebic Colitis.**—*Indian Jl. Med. Res.* 1918. Oct. Vol 6. No. 2. pp. 157-161.

Noting the frequency of Charcot-Leyden crystals in association with his amoebic patients the writer analysed a number of his cases. Out of 400 Entozoa-infections he found the crystals in 32 cases, but 28 of these had *Entamoeba histolytica* cysts or *minuta* forms as well. He concludes that the crystals are rarely found with pure entozoal infections. In 1,561 patients, 397 of whom showed amoebae in the stools, the crystals were more frequently found in chronic cases. In non-amoebic dysenteric cases they were rarely found.

Describing the crystals he says that they are long in acute amoebic dysentery and shorter in chronic types and carrier cases. They appear to persist for some time after amoebae have disappeared as the result of emetine treatment.

F. W. O'C.

BRUG (S. L.). ***Endolimax Williamsi*. the Amoeboid Form of the Iodine Cysts.**—*Ind. Jl. Med. Res.* 1919. Jan. Vol 6. No. 3. pp. 386-392. With 1 plate & 2 figs.

An amoeba, not identified with other known human species, was found associated with the presence of Iodine cysts in a patient's stool. The free living parasite measured 12-20 μ and exhibited sluggish movements. Differentiation between ecto- and endoplasm was not distinct: in the latter bacteria were seen but vacuoles were rarely noticed. The protoplasm was less refractile than in *E. coli* and *E. histolytica*. The endoplasm appeared to be rejected before death and part of the ectoplasm was sometimes observed to be detached from the main body.

The nucleus measures from 3-6 μ ; its membrane is represented as a fine line which surrounds a large karyosome, apparently composed of numerous, accumulated, highly refractile granules. Between the karyosome and membrane there is a narrow clear halo which does not contain chromatin. As the karyosome appears eccentric the halo seems to be thicker at one side. In stained specimens some of these points are rendered clearer. Binucleate forms were occasionally observed by the author.

Describing the cystic forms or Iodine cysts the writer says:—

"Near the karyosome is seen a crescent shaped cluster of chromatin granules, the granules sometimes being united by a network of achromatic

threads The karyosome is situated in the concavity of the crescent. These two parts of the nucleus are lying in an unstained area suggesting a vacuole. In particularly well stained cysts a faintly coloured nuclear membrane may be seen to limit this area."

The free amoeba is believed to be identical with PROWAZEK'S *Entamoeba williamsi* and tallies with the description of the latter as regards

- (a) Nuclear structure and size of karyosome.
- (b) Scarcity of vacuoles in the living state.
- (c) Reduction of the protoplasm.

[The free forms observed by the author were probably precystic forms judging from the stress which is laid on the scarcity of vacuoles. this phenomenon has been observed in all entamoebae before encystation. On the other hand other observers have frequently seen free amoebae, associated with the presence of Iodine cysts and otherwise having much in common with the writer's parasite in which, however, vacuoles have been numerous and fairly constant.]

The specific unity of the free amoebae and Iodine cysts is considered established

(1) on the morphology; (2) on the constant demonstration of the amoeba in the stools of patients infected with Iodine cysts. The evidence is supported by the comparative rarity (in the author's experience = 2 per cent) of the amoeba and cysts in stools.

The writer places the amoeba in the genus *Endolimax* with the specific term *williamsi*.

F. W. O'C

WATTS (R. C.). Ciliated? Amoeba in Liver Abscess.—*Brit Med. Jl.* 1919. Mch. 29. p. 378.

Cells were found in liver abscess pus, some of which contained red blood cells. The ectoplasm was refractile. A distinct excentric nucleus was seen. "From the periphery of the nucleus small cilia-like bodies in constant motion were evident." No movements by means of pseudopodia were observed.

F. W. O'C.

BRUG (S. L.). *Entamoeba cuniculi* N. sp.—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1918 Vol. 58. No 5. pp. 811-812. With 3 figs.

In the faeces of an imported Australian rabbit the oocysts of a coccidium were found. Entamoebae cysts were also discovered; many of the latter contained eight nuclei and the dimensions were 8.8-18.4 μ . Some vegetative free amoebae were also found. In spite of morphological similarity to the human *Entamoeba coli* the author is unable to say if the two amoebae are the same.

F. W. O'C.

BRUG (S. L.). La coloration des entamibes intestinales des selles.—*Bull. Soc. Path. Exot.* 1919. Feb. Vol. 12. No. 2. pp. 71-72.

The following modification of the Heidenhain method is recommended for preparing specimens quickly for diagnosis.

(C570)

1. Spread the faecal material in a thin layer on a slide.
2. Fix with Schaudinn's fixing solution
3. Wash in water for some seconds
4. Extract the sublimate with alcoholic iodide (70 per cent. alcohol : Iodine sufficient to give reddish brown colour) 2 minutes.
5. Wash with water
6. Extract Iodine with Hyposulphite of Soda, 0.2 per cent. for two minutes
7. Wash in Water.
8. Mordant for 10 minutes with a 3 per cent Mohr solution.
 $\text{Fe}(\text{NH}_4)_2(\text{SO}_4)_2 + 6\text{H}_2\text{O}$.
9. Wash in running water 1 minute.
10. Stain 10 minutes with Heidenham's haematoxyline
11. Wash in running water 10 minutes
12. Alcohol 96 per cent some seconds
13. Absolute Alcohol 1 minute
14. Xylol 1 minute
15. Mount in Balsam

To obtain differentiation of free *Entamoeba histolytica* the following modification is advised :—

- 1-8. Fix and mordant as above.
9. Wash in running water 10 minutes.
10. Stain with Heidenham's Haematoxyline 10 minutes.
11. Wash in running water 10 minutes
12. Stain with Delafield's Haematoxyline diluted with distilled water 1-10 for 1 minute
13. Wash in water for a few seconds.
14. Stain with a saturated solution of Acid Fuchsin (rubine S) 1 minute
15. Wash in water till the violet of the Delafield and the red of the fuchsin removed, begin to reappear.
- 16-19. As above (Nos 12-15).

According to the author successful preparations show the nucleus as dark blue, the protoplasm violet, and included red cells red.

F. W. O'C.

BACTERY DYSENTERY.

DUDGEON (L. S.) *The Dysenteries : Bacillary and Amoebic.*—*Brit. Med. J.* 1919. Apl. 12. pp. 448-451.

In opening a discussion on bacillary dysentery before the British Medical Association in April 1919 Dudgeon pointed out that dysentery bacilli may be isolated from patients who have had slight transient diarrhoea without any further clinical manifestations. In addition to their epidemiological importance such cases may explain the abnormal serological findings not infrequently referred to in the literature. In only two out of 145 blood cultures of cases of acute dysentery was the Flexner bacillus recovered from the blood stream. In the bacteriological examinations of the stools a high percentage of positive findings can be obtained only if the samples are received in the fresh state. If faeces are present in addition to blood and mucus it is essential to avoid delay. A higher percentage of positive findings occurred when it had been necessary to delay the bacteriological examination for some hours if an equal volume of 3 per cent. sodium hydrate were added to the stools. All the recognised types of dysentery bacilli including the *B. dysenteriae* Schmitz [see this *Bulletin*, Vol. 11, p 260] were obtained in the Balkans. Inagglutinable bacilli giving the cultural characters of Flexner's bacillus should not be rejected as the cause of dysentery. If several anti-Flexner serums

are employed as a routine procedure for the investigation of the mannite fermenter serological reactions may be obtained which otherwise could be considered inagglutinable. A rise in the incidence of Morgan's Bacillus No 1 was observed in certain periods of the dysentery season, but agglutination of this bacillus never occurred with the patients' serum. Dudgeon agrees with the statement of MURRAY "that Michaelis's acid agglutination reaction is of no value in determining whether or not a given bacillus belongs to the dysentery group." Twenty-five cases of arthritis were observed, conjunctivitis being associated with the arthritis in some instances.

In considering the fly as a carrier of bacillary dysentery Dudgeon considers that (1) Bacillary dysentery is most prevalent when flies are most numerous. (2) Flies after contact with food infected with dysentery bacilli are capable of disseminating these bacilli for at least twenty-four hours. (3) Dysentery bacilli were isolated from wild flies captured in places in which bacillary dysentery is both endemic and epidemic. He considers that the following points require further investigation. (a) The vitality of dysentery bacilli in water, (b) The relationship of flies to bacillary dysentery, (c) The Flexner group dysentery bacilli, especially the inagglutinable strains, (d) The toxins produced by dysentery bacilli, (e) The preparations of more suitable anti-serums for the treatment of the disease.

F. E. Taylor.

MACKIE (T. J.). *The Atypical Dysentery Bacilli.—Jl. of Hygiene.* 1919 Apl. Vol. 18. No. 1. pp. 69-75.

Working in Egypt in 1916 and 1917 Mackie found that the number of cases of dysentery from which the classical dysentery bacilli could be isolated was exceptionally low. He therefore turned his attention to the so-called "atypical *B. dysenteriae*," especially such as occurred in large numbers in the excreta during the earlier phases of acute cases in which amoebae were absent. Some were designated "inagglutinable *B. Shiga* or *B. Flexner*." The group is defined as (1) Gram-negative, non-motile bacilli not liquefying gelatine, always fermenting glucose without gas production, (2) different strains varying as regards the fermentation of lactose, dulcitol, saccharose, mannite, maltose (but never producing gas in any case) and the formation of indol from peptone, and (3) not agglutinated by a Flexner Y or Shiga serum.

The Shiga infections were mostly of the severe type and the atypical *B. dysenteriae* infections of the milder type whilst the Flexner infections occupied an intermediate position. Although early in the disease the dysentery bacilli were present in enormous numbers and often in pure culture, they tended to disappear later and to be replaced by concomitant organisms such as *B. Morgan* No. 1, *B. faecalis alkaligenes*, *B. paracolon* types, *B. proteus* types, etc.

Mackie considers that these results render the significance of bacteriological findings in convalescent cases of extremely dubious value so far as throwing light on the etiology of bacillary dysentery is concerned.

F. E. T.

BROUGHTON-ALCOCK (W). Two Outbreaks of Mild Dysentery—*Brit Med. J.* 1919. May 31. pp. 666-667.

Two outbreaks of mild dysentery were encountered in the Mediterranean littoral during July 1918 in which the *B. dysenteriae* Schmitz [see this *Bulletin*, Vol. 11, p. 260] was isolated. *B. pyocyaneus* was also isolated in the first, but not in the second outbreak. The onset was sudden and acute, the symptoms being those of a mild form of dysentery with vomiting and abdominal pain. The duration of the attack averaged three to four days. There were no deaths. The first outbreak was in a camp of 3,000 troops of whom 12 officers and 350 men were attacked in one week. The second outbreak was a smaller one, being confined to the personnel of a military hospital. No agglutination of the Schmitz bacillus was obtained with the serum of seven patients and Michaelis's Acid agglutination [see this *Bulletin*, Vol. 11, p. 263] was negative with three strains. That the Schmitz bacillus, if not the real cause, played some part in these outbreaks was shown by the presence of this bacillus in considerable numbers in the stools showing dysenteric characters and its absence when the stools returned to normal. Further the author has never found the Schmitz bacillus in a stool from a patient without a history of dysentery nor in normal stools. Broughton-Alcock considers that the Schmitz bacillus and the *B. ambiguus* of ANDREWES [see this *Bulletin*, Vol. 12, p. 16] may be placed in one group and that it will be interesting to learn the comparative results with para-Shiga strains of DUDGEON and others from the Mediterranean littoral.

F. E. T.

RYLE (John). Mild Bacillary Dysentery: Clinical Investigation and Diagnosis.—*Lancet*. 1919. May 31. pp. 937-938.

Ryle records his clinical impressions in cases of diarrhoea and dysentery observed in France and Belgium from 1916 to 1918. In a total of 107 cases there were 36 "clinically positive," i.e., with blood and mucus, 14 "clinically suspect" with no blood or mucus but other suggestive features, the rest being clinically negative cases which were considered at first not to be dysenteric infection. There were 17 positive bacteriological findings of which 13 were Flexner and 4 Shiga infections. The Flexner cases were habitually milder than the Shiga cases. One fifth of the cases which on cursory examination would have been regarded as diarrhoea were proved to be dysenteries.

In the absence of blood, mucus and pus, the features of mild bacillary dysentery are:—(1) Slight and transient initial pyrexia, (2) Slight continued diarrhoea with griping pains in spite of routine treatment. (3) Relapse of diarrhoea. (4) Frequency and urgency. (5) A worried unhappy expression and slight pallor with persistence of diarrhoea. (6) A redness and laxity about the anal orifice. Ryle believes that bacillary dysentery is susceptible of clinical recognition in a high proportion of cases, even in the absence of blood and mucus from the stools.

F. E. T.

MACNALT (A. Salusbury). **Report to the Local Government Board on Two Outbreaks of Acute Dysentery in London.**—*47th Ann. Rep. of the Local Government Board. Supplement containing Report of the Medical Officer for 1917-18.* pp. 16-45. With 2 plans and 2 diagrams.

Macnalty reports two outbreaks of acute dysentery which occurred in London—one in Chelsea, the other in Islington—during the autumn of 1917 and draws conclusions some of which are reproduced:—

“(1) They were small and localised outbreaks of definite and usually severe bacillary dysentery due to infection by *B. Shiga*, altogether distinct in nature, symptoms of cases, and in origin of infection from any current infectious autumnal diarrhoea present at the time in the neighbourhoods concerned.

“(2) The circumstances of the households and persons affected, the opportunities for infection taking place within and without the dwelling; the fact that the number of affected households was small while the incidence of the disease was intense in some of them, are all consistent with the view—

“(a) That in most instances the first case in a household was attributable to infection contracted from close association with one of the known antecedent cases elsewhere in the locality, or with other members of a family in which antecedent cases had occurred, or with visiting premises where cases of dysentery were occurring.

“(b) That to account for the occurrence of the chain of cases in Chelsea it would suffice to assume that it began with the association of one or at most two cases of *Shiga* infection with persons of the households first affected, the rest of the chain following as in (a). A similar introduction of infection to one of the households would explain the whole Islington group.

“(c) Infection with the bacillus of *Shiga* is rare in London, and the introduction of this infection into a household by a carrier is not, in normal times, at all a likely event. The prevalence of dysentery in the Forces abroad, however, notwithstanding the magnitude and thoroughness of the Army arrangements for detecting chronic bacillary carriers, entails an additional risk of such introduction by means of soldiers returned home on leave or under hospital treatment. In the present instance there were some reasons to suspect that such introduction of infection might have occurred, but no positive proof was forthcoming.”

* * * * *

F. E. T.

LAEMPE (Rudolf). **Zur Kenntnis der Ruhrepidemie in Dresden im Sommer 1917.** [On the Epidemic of Dysentery in Dresden in the Summer of 1917.]—*Berlin. Klin. Woch.* 1918. Apl. 29. Vol. 55. No. 17. pp. 395-398.

In July 1917 there was a sudden increase in the number of patients admitted to the City Hospital in Dresden for severe dysentery-like catarrh of the intestines. The infectivity of this condition was not at first recognised, being ascribed to unsuitable and insufficient food. On the application of bacteriological methods dysentery bacilli were recovered from the stools of 15 per cent. of the cases, *Shiga-Kruse* being found seven times, *Y*-bacilli twelve times and *Flexner* once. The disease occurred at all ages though children were relatively little affected. The onset was usually sudden. The symptoms and course of the disease were for the most part characteristic of bacillary dysentery. In some of the children, however, the onset presented

the characters of meningitis,—unconsciousness, stiffness of the neck and convulsions. In the majority of the cases these meningeal symptoms rapidly disappeared but in one fatal case autopsy revealed oedema of the brain in addition to severe dysenteric intestinal lesions. Although only severe cases were admitted the mortality was only twelve per cent. As regards treatment bolus alba by mouth and by enemata or a combination of bismuth subnitrate and Carlsbad salts gave such satisfactory results that serum therapy was seldom resorted to. In a few very severe cases only was a polyvalent serum given in doses of 40 to 50 cc. with doubtful results. Great stress is laid on the importance of diet, commencing with a hunger diet and very gradually adding other substances. Vegetables, except sliced carrots which are well tolerated, must be withheld for a very long time

F. E. T.

ABEL (R.) & LOEFFLER. Eine Ruhrepidemie von explosivem Charakter hervorgerufen durch ein infiziertes Nahrungsmittel. [An Epidemic of Dysentery of Explosive Character produced by an Infected Foodstuff.]—*Ztschr. f. Hyg. u. Infektionskr.* 1918. Dec. 17. Vol. 87. No. 3. pp. 410–428.

Abel and Löffler record an epidemic of Shiga-Kruse dysentery occurring in a reserve battalion of the Landsturm. The epidemic was explosive in its onset and rapidly subsided, 378 cases being observed between January 31st and March 2nd, 1918, the majority occurring before February 8th. Outbreaks of this character, though common in enteric and cholera, are seldom seen in dysentery. The epidemic was definitely traced to potato salad which had been eaten on January 27th, the occasion of the Kaiser's birthday, since all who were attacked with one exception (probably an early contact infection) had eaten the salad, whilst the officers of the battalion who fed at a different mess and 585 men of the affected battalion who also fed at a different mess, together with 230 men quartered in the neighbouring town, escaped infection. Of the 1,369 persons who ate the infected salad 378 (=27·61 per cent) were attacked. No details of the bacteriological investigations are given. The mortality of the epidemic was small as there were only eight deaths and one of these was from faucial diphtheria.

The measures taken to check the epidemic were :—(1) the exclusion of further infection from the kitchen and (2) the prevention of further infection from the actual cases to the rest of the battalion and civilians. Then all affected and suspected cases were isolated in hospital and examined : all leave was stopped ; kitchens and latrines were carefully disinfected, the kitchen staff medically inspected daily and their personal cleanliness rigorously enforced. Later a dysentery vaccine was employed.

F. E. T.

KECK (Ludwig). Beitrag zur Klinik und Bakteriologie der Ruhr. [A Contribution to the Clinical and Bacteriological Aspect of Dysentery.]—*Ztschr. f. Hyg. u. Infektionskr.* 1918. June 10. Vol. 86. No. 2. pp. 277–296.

Keck, assistant in the clinic in Strasburg, records the results of an extensive series of agglutination tests made in the summers of 1916

and 1917 when small epidemics of dysentery occurred in Strasburg. The sera of patients suffering from dysentery as well as those of non-dysenterics were tested, the macroscopic method of KOLLE and PFEIFFER being employed. In reading the results both coarse clumping observed with the naked eye and fine clumping which required the employment of a low power magnifying glass were noted. He considered that an agglutination titre of 1 in 200 and upwards was diagnostic of infection with Y-Flexner bacilli and that with these organisms the recognition of the fine clumping with the lens was of no diagnostic value. With regard to Shiga-Kruse agglutination, on the other hand, fine clumping is of diagnostic importance and varies with the strain of Shiga-Kruse bacilli employed. Keck's own strain possessed diagnostic value in a titre of 1 in 200 and upwards by this method. Ordinarily a Shiga-Kruse agglutination of 1 in 100 (+) was diagnostic. He contends that Shiga-Kruse and Y-Flexner dysenteries should not be distinguished as toxic and atoxic dysentery respectively since very toxic clinical pictures can also be produced by the latter bacilli.

Between the acute primary dysentery and certain special complications, especially arthritis and conjunctivitis, a certain time interval must elapse, these complications being in close relationship with immunisatory changes in the organism. Serum treatment, even in large doses, is without effect in these complications. Both arthritis and conjunctivitis have only been observed with certainty in Shiga-Kruse infections: for their occurrence in Y-Flexner infections further observations are necessary. They appear to be toxic phenomena, in the production of which the endotoxins may play a causative rôle.

F. E. T.

UNGERMANN (E.) & JOETTEN (K. W.). *Ergebnisse und Beobachtungen bei der bakteriologisch-serologischen Ruhrdiagnose.* [Results and Observations on the Bacteriological and Serological Diagnosis of Dysentery.]—*Med. Klinik* 1918. Apl. 7 & 14. Vol. 14. Nos. 14 & 15. pp 334-337; 362-366.

Ungermann and Jotten point out how small is the number of positive results obtained by the methods ordinarily employed in the bacteriological examination of material from cases of dysentery. They therefore attempted to obtain better results by employing improved methods of taking and sending specimens for examination, using more suitable culture media and employing auxiliary methods which appeared to promise greater selective action for dysentery bacilli. Flocculi of mucus were taken from the stools as soon as possible after they were voided, washed in sterile water and then suspended in a mixture consisting of 80 cc. of sterilised ox gall and 20 cc. of alkaline bouillon in which they were transmitted to the laboratory with the least possible delay. This procedure protects the dysentery bacilli from being overgrown by the saprophytic intestinal organisms. This was then spread on a series of plates, namely, two Endo, two ordinary agar, one serum agar and one blood agar. By these means the authors were able to isolate dysentery

bacilli in 8 cases at the first examination which had failed to yield these organisms to ordinary methods of investigation.

Of 57 cases in which dysentery bacilli were isolated, 47 were type Y, 13 Shiga-Kruse and 2 Flexner bacilli. Mixed infections with more than one kind of dysentery bacillus were never encountered. With regard to diagnostic agglutination the authors consider agglutination with the Shiga-Kruse bacilli 1 in 100 as positive and flocculation at 1 in 50 as "probable." With Y and Flexner bacilli agglutination at 1 in 200 was considered positive. They consider that a careful choice of a suitable strain whose agglutinating power is frequently tested is essential.

F. E. T.

BALLMANN (Erich). Ueber Bazillenruhr.—*Munch. Med. Woch.* 1918. Nov. 5. Vol. 65. No. 45. pp 1238-1240.

In the autumn of 1917 several small epidemics of dysentery occurred in Hanau and the neighbouring villages in two of which the origin of the outbreak could be definitely traced to certain houses. They were bacillary in type, the Shiga-Kruse bacillus being recovered in 18 cases, Flexner in 2 and the Y bacillus in 13. In nearly all the cases the disease had a sudden onset. The mortality reached 18 per cent. in civilians and 8 per cent. in soldiers, intractable hiccough being the symptom indicating the worst prognosis. The best results were obtained by enemata of tannalbin followed by tannin by the mouth. The administration of serum produced no definite effects. Thymol-palmitic acid ester gave good results but was too expensive for extended use.

F. E. T.

GOLDZIEHER (M). Bakteriologische und serologische Untersuchungen über Dysenterie. [Bacteriological and Serological Investigations in Dysentery.]—*Cent. f. Bakt.* I. Abt. Orig. 1919. Feb. 28. Vol. 82. No. 6. pp. 437-449.

Goldzieher considers that all practical purposes are served by the classification of dysentery bacilli into two great groups: (1) the toxic Shiga-Kruse group and (2) the atoxic Flexner-Strong-His group. This classification takes cognisance of their biological differences (toxin, indol, and acid production), of their differing immune body content, of the differences in pathogenicity and in the clinical aspect of their infections as well as in their applications to serum therapy. Hence their further subdivision appears to be unwarranted either on theoretical or on practical grounds. The Schmitz bacillus, possessing some of the characters of both groups, forms a connecting link between them.

In 1,479 bacteriological examinations of the stools Goldzieher obtained 141 positives (=9.3 per cent.). This low figure was attributed to the fact that only few cases were examined early in the disease, most being in the subacute or chronic stage.

The agglutination reaction was found to be so unreliable as to be of little value in the diagnosis of dysentery or for the differentiation

of the causal organisms into their groups. The therapeutic injection of dysentery vaccines, even when repeatedly administered at short intervals was found to produce no rise in the agglutination titre of the patient's sera

F. E. T.

COWAN (John) & MACKIE (F. J.). *A Note upon the Modes of Infection in Bacillary Dysentery.*—*Jl. Roy. Army Med. Corps.* 1919. Mch. Vol 32. No. 3. pp. 209–214.

Working in Alexandria in 1916 Cowan and Mackie investigated some of the methods by which the infection of bacillary dysentery was conveyed from one individual to another. Although their investigations were incomplete owing to the press of work their data show that the source of infection was infected stools and that the possible modes of infections were (1) water, (2) sand, (3) food, (4) flies and (5) fingers. They lay little stress on the first four factors and consider that the personal equation requires further attention and investigation. The washing of hands after going to the latrines and before meals, though impossible in the field, is generally possible in standing camps. Infected hands may convey the infection to an indefinite number of people, if employed in the cook house or the dining room. They consider that direct personal infection is a factor that requires more attention than it has received in the past.

F. E. T.

FLU (P. C.). *Experimental Contribution to the Knowledge of the Carrying of Bacilli in Bacillary Dysentery.* (Also in Dutch.)—*Meded. Geneesk. Lab. te Weltevreden.* 1917–1918. 3 ser. A. No. 1 & 2 pp. 123–137.

Flu considers that the chronic bacillary dysentery carriers hitherto described have not been carriers proper, i.e., with absolutely normal intestinal mucosa, but have been sufferers from chronically recurring bacillary dysentery. As the result of experiments on animals he finds that Flexner bacilli grow readily in bile. From this fact together with the fact that he has found Flexner and Y bacilli in the general circulation and the discovery of BRUCKNER of Y bacilli in the bile ducts of a female carrier of Y bacilli it is desirable to investigate how often dysentery bacilli of the non toxic type are to be found in the bile of persons dying of bacillary dysentery as well as that of all bodies which are being dissected.

F. E. T.

McWALTER (J. C.). *Are Relapses of Bacillary Dysentery Frequent?* [Correspondence.]—*Lancet.* 1919. Mch. 29. p. 529.

McWalter, writing from Egypt, asks whether it is the general experience of practitioners in England that cases of bacillary dysentery returned from abroad as cured do not relapse, seeing it is stated that of some 1,300 cases of dysentery sent back to England as cured since the war not a single one was found to show signs of bacillary dysentery, while some 12 per cent. were found with *Amoeba histolytica*.

F. E. T.

RICHERS (Josef) *Elne chronische Form der Pseudo-dysenterie im Kindesalter.* [A Chronic Form of Pseudo-Dysentery in Children.] —*Monatschr f Kinderheilk.* 1918. Vol. 15. No. 1. pp. 40-51.

Richers records five cases of Flexner-Y dysentery observed in recent years in the childrens' clinic at Göttingen. The ages ranged from one year and five months to 9 years. In two cases bacilli were recovered from the stools and in three cases serum agglutination in 1 in 100 was obtained. The symptoms were anomalous and the commencement of the disease insidious. Recurrences were not infrequent. Richers considers that if in future in cases of ill-defined illness in children the possibility of chronic dysentery be borne in mind and the necessary investigations undertaken, then chronic recurrent forms of pseudo-dysentery will no longer remain rareties

F. E. T

CAUSSADE (G) & MARBAIS (S.). *Septicémie à Bacille de Shiga et absence de ce bacille dans les selles.*—*Bull. et Mém. Soc Méd Hôpit. de Paris.* 1919. Mch. 6. Vol. 35. No. 7-8. pp. 145-151.

Caussade and Marbais record a case of dysentery with acute cholera-like onset and death on the twelfth day, with lesions in the large intestine characteristic of bacillary dysentery. Bacteriological examination of the stools was negative, but in blood cultures taken the day before death bacilli were obtained in bouillon which gave the cultural characters of the Shiga bacillus and were agglutinated by a Shiga serum in dilution of 1 in 100. Blood cultures in bile were negative. No previous case of dysentery septicaemia with absence of dysentery bacilli in the stools appears to have been recorded.

F. E. T.

RATHERY (F.), RANQUE & RAUX. *Essais de vaccinothérapie anti-dysentérique.*—*Bull. Acad. Méd* 1918. Dec. 24. Vol. 80. No. 51. pp. 636-638.

The authors have obtained encouraging results in the treatment of bacillary dysentery by vaccine therapy, although it was sometimes combined with serum therapy. The dysentery was of the Shiga-Kruse type or an aberrant variety. Ranque and SENEZ's method was employed in the preparation of the vaccines. Very young cultures were made into a standardised emulsion of which 1 cc. contained 50 million bacilli. Sterilisation of the emulsion and attenuation of the toxins was obtained by iodine. The doses employed were $\frac{1}{4}$ - $\frac{1}{2}$ cc. for the first injection, 1 cc. for the second, $1\frac{1}{2}$ for the third and any subsequent injections. At first autovaccines made from strains isolated from the patients' stools were employed, but later a stock vaccine comprising several different strains was used. The injections were well borne, producing merely a slight local reaction limited to the site of injection.

F. E. T.

YANDELL. A New and Successful Treatment for Bacillary Dysentery.
—*Southwestern Medicine* 1919. Mch Vol. 2 No. 15. pp. 4-5.

From experiences of an epidemic of 102 cases of dysentery at Sacaton, Arizona, Yandell believes that (1) Adrenalin chloride hypodermically will promptly cure the haemorrhages of dysentery and, (2) Thymol in large doses on an empty stomach, is an efficient and, apparently, a specific remedy for bacillary dysentery.

F. E. T.

LAMPL (Hans). Ueber einen neuen Typus von Dysenteriebazillen (*Bact. dysenteriae* Schmitz).—*Wien. Klin. Woch.* 1918. July 25. Vol 31 No. 30 pp. 835-837.

Three children who presented symptoms of acute dysentery in the Wilhelmina Hospital in Vienna died in June 1917. The clinical diagnosis was confirmed at the autopsy when acute inflammatory change with necrosis was found in the large intestine. The bacillus isolated from these cases showed the characteristic cultural characters of the Shiga-Kruse bacillus and also produced indol, but did not agglutinate either with the patients' sera or with Shiga-Kruse sera. These characters agree with those given by SCHMITZ for his *Bacillus dysenteriae* which Lampl considers was the causative organism in his cases of dysentery and which on account of its cultural and serological characters must be differentiated from the other dysentery bacilli.

F. E. T.

HIRSCHBRUCH & THIEM (Hugo). Ueber Ruhrbazillen vom Typus Schmitz. [On Dysentery Bacilli of the Schmitz Type.]—*Deut. Med. Woch.* 1918. Dec. 5. Vol. 44. No. 49. pp. 1353-1354.

In the summer of 1918 the authors examined in July 214 cases of dysentery and found Shiga's bacillus in 64 (30 per cent.), pseudo-dysentery bacilli in 98 (46 per cent.) and bacilli of the Schmitz type in 52 (24 per cent.). They were able to produce an anti-serum to the latter bacilli up to a titre of 1 : 1600. In one fatal case with a typical history of dysentery there was found *post mortem* severe purulent colitis with catarrhal enteritis in the lower part of the ileum and swelling of individual follicles. Hyperplasia of the spleen and cloudy swelling of the kidney, heart and liver were also present. The bacillus of Schmitz was obtained in large numbers by direct cultivation from the intestine, but not from the bile, liver or spleen. The bacilli were agglutinated to titre by a Schmitz serum. Two days after working with these cultures a female assistant in the laboratory was seized with slimy diarrhoea which lasted a fortnight. Schmitz bacilli were obtained by cultivation from her faeces. The authors consider that the Schmitz bacillus is a definite cause of dysentery, and that its discovery has considerably improved the present position of the bacteriological diagnosis of dysentery.

F. E. T.

- i. GEHRMANN (Otto). Zur Klärung der Frage nach der Ruhrerregerschaft eines dysenterieähnlichen Bakteriums. [The Problem of the Production of Dysentery by a Dysentery-like Bacterium].—*Deut. Med. Woch.* 1918. Sept. 12. Vol. 44. No 37. pp. 1025-1027.
- ii. SCHMITZ (K. E. F.). Ist der *Bacillus dysenteriae* Schmitz ein Ruhrerreger? Entgegnung auf die Arbeit von O. Gehrman in Nr. 37 Dieser Wochenschrift. [Is the *Bacillus Dysenteriae* Schmitz a Dysentery-producer? Reply to the work of O. Gehrman].—*Ibid.* Oct 10 No 41. pp 1127-1128.

i. Gehrman casts doubt on the rôle played by the *Bacillus dysenteriae* Schmitz in the causation of dysentery chiefly on the grounds (1) that it does not possess true toxicity though toxicity is produced by subjecting the bacillus to heat, and (2) that the serum of patients from whose stools this bacillus is isolated do not agglutinate it.

ii. Schmitz in reply states that the *Bacillus dysenteriae* Schmitz does produce toxins which bring about ulceration of the intestines after six days when injected into animals. As regards agglutination two strains of the Schmitz bacillus agglutinated both Schmitz and Shiga-Kruse and in the application of CASTELLANI's absorption method the Schmitz-agglutinin was the primary agglutinin and the Shiga-Kruse the secondary or co-agglutinin. Schmitz also includes the mannite negative J strain of Kruse in the type Schmitz. He considers that those who deny the pathogenic dysentery-producing power of the Schmitz bacillus must also deny the pathogenic dysentery-producing power of the remaining dysentery bacilli.

F. E. T.

LOYGUE (G.), BONNET (H.) & PEYRE (E.) Remarques sur le diagnostic bactériologique de la dysenterie.—*Bull. et Mém. Soc. Méd. Hôp. de Paris.* 1918. Dec. 5. 3 Ser. Vol. 34. No. 32-33. pp. 1096-1099.

A comparison of the results obtained during an epidemic of bacillary dysentery by bacteriological examination of the stools and by the serological examination of the blood is given by the authors. The examination of the stools of 118 cases gave only 16 positive results, the Shiga-Kruse bacillus being found in 14 cases and the Flexner bacillus and the His bacillus in one each. The serological examination of 150 cases gave 86 positive agglutinations, namely, 79 Shiga-Kruse and 7 Flexner.

F. E. T.

MAYMONE (Bartolo). Sulla presenza del bacillo di Shiga-Kruse in vari organi interni di cadaveri di dissenterici.—*Igiene Med.* 1918. Jan. Vol. 11. No. 1. 7 pp. [Summarized in *Bull. Inst Pasteur.* 1918. Vol. 16. p. 570.]

The few authors who have dealt with this subject are quoted by Maymone, who made cultures from the heart's blood, the liver, the spleen, the kidney and the bile of 5 cadavers 24 hours after death. In two cases he recovered *B. dysenteriae* Shiga-Kruse from the heart's

blood, the spleen, the liver and the bile, in one case pure, in the other associated with *Proteus vulgaris*. The isolated bacillus presented all the biochemical characters of Shiga-Kruse, being pathogenic for the rabbit and agglutinating in dilutions of 1 in 500 and 1 in 1,000 respectively a specific serum with a titre of 1 in 1000.

F. E. T.

VON ANGERER (Karl) *Zum Nachweis von Typhus- Paratyphus- und Ruhrbazillen im Stuhl* [The Recognition of Typhoid, Paratyphoid and Dysentery Bacilli in Stools]—*Munch Med. Woch* 1918 Aug 13 Vol 65. No. 33. pp. 907-908.

For the identification of typhoid, paratyphoid and dysentery bacilli in stools the author relies on plating on Drigalski agar and investigating the characters of likely colonies as to their microscopic characters, especially motility, their fermentation reactions on glucose, lactose, maltose, mannite and saccharose media and their agglutination titre.

F. E. T.

- (i) VINCENT (H.) *Influence de la bile sur le bacille de la dysenterie.* (A propos d'une note récente de M. Marbais).—*C.R. Soc. Biol.* 1919 Feb. 8. Vol. 82. No. 3. pp. 84-85.
- (ii) MARBAIS (S.) *Action de la bile non chauffée sur les bacilles dysentériques.*—*Ibid* Feb. 22. No. 4 pp. 166-168
- (iii) VINCENT (H.) *Bacille dysentérique et bile* (Nouvelles remarques á propos d'une communication de M. Marbais sur le même sujet.)—*Ibid.* Mch. 8. No. 6. pp. 212-213.
- (iv) MARBAIS (S.) *Action de la bile sur les bacilles dysentériques.* (A propos des notes de H. Vincent sur le même sujet.)—*Ibid.* Mch. 15. No. 7. pp. 238-240.
- (v) VINCENT (H.) *Bile et bacille dysentérique.*—*Ibid.* Mch. 29. No. 9. pp. 304-305.

A polemic between Vincent and Marbais. The latter insists that normal fresh ox-bile exerts no harmful effect *in vitro* on the vitality and multiplication of the different varieties of dysentery bacilli. Vincent, on the other hand, reiterates the opinion previously published that both *in vivo* and *in vitro* bile constitutes a very unfavourable culture medium for dysentery bacilli, possessing even a microbicidal action on the Shiga-Kruse bacillus which he correlates with the observation that dysentery bacilli cannot be found in the bile or biliary passages of animals experimentally inoculated with dysentery bacilli.

F. E. T.

MASSINI (Rudolf). *Dreifarbennährboden zur Typhusruhrdiagnose.* [Three Colour Media for the Diagnosis of Typhoid and Dysentery.]—*Correspondenz Blatt. f. Schweizer Aerzte.* 1918. June 29. Vol. 48. No. 26. p. 887.

Massini being unable to obtain in Basle the German dyes required for Gassner's water-blue-metachrome-yellow three colour medium for typhoid and dysentery investigations employed the following similar medium with dyes procurable in Switzerland :—to a litre of

3 per cent agar containing 3 per cent. lactose is added one gramme of Enochrome-yellow 2 gm. and 0.65 gm. of Helvetia-blue. The colouring matters readily dissolve in the agar and this medium possesses the advantage over Gassner's medium that it can be sterilised in the steam steriliser without the colouring matters being thrown down.

F. E. T.

EGYEDI (Heinrich). *Züchtungsbedingungen des Shiga-Kruseschen Dysenteriebazillus und Brauchbarkeit des Endoschen Nährbodens.* [Conditions of Growth of the Shiga-Kruse Dysentery Bacillus and the Usefulness of Endo's Medium.]—*Cent f Bakt* 1. Abt. Orig. 1919 Feb 28. Vol. 82 No 6 pp. 454-456.

Egyedi investigated the influence of varying the reaction of agar and of Endo's medium on the growth of the Shiga-Kruse bacillus and recommends as the most favourable for its growths Endo's medium to which has been added 4 cc of a 10 per cent. solution of caustic soda per litre (= 0.4 per thousand).

F. E. T.

FLU (P. C.). *About the Presence of Agglutinines against Flexner Bacilli in the Blood Serum of Normal Persons in Batavia.* [Also in Dutch.]—*Meded. Genesck. Laboratorium te Weltevreden.* 1917-18. 3 Ser. A. No. 1-2. pp. 111-112.

It was pointed out by SNYDERS that in Sumatra the sera of non-dysenterics frequently agglutinated Flexner and Y-dysentery bacilli in dilutions of 1 in 100 or even higher. Flu investigated this question by examining the blood of 107 non-dysenteric resident Europeans in Weltevreden in Batavia with the following results:—

Agglutination against Flexner					Agglutination against Shiga-Kruse.				
Negative	..	..	..	14	Negative	..	..	..	103
Positive	1/50	..	..	16	Positive	1/50	..	..	1
"	1/75	..	..	11	"	1/100	..	..	2
"	1/100	..	..	12	"	1/200	..	..	1
"	1/150	..	..	16					
"	1/200	..	..	32					
"	1/300	..	..	2					
"	1/700	..	..	1					
"	1/800	..	..	2					
"	1/900	..	..	1					
Total				107	Total				107

F. E. T.

MAYMONE (Bartolo). *Sulla comparsa delle agglutinine specifiche nel sangue dei dissenterici.*—*Riv. di Igiene e San. Pub.* 1918. Vol. 39. 6 pp. [Summarized in *Bull. Inst. Pasteur.* 1918. Vol. 16. p. 567.]

The time of appearance of the specific agglutinins in the blood in dysentery is very variously estimated by different authors. From

August to October 1917 Maymone observed under extremely favourable conditions 192 patients coming from the same epidemic centre, where the severity of the prophylactic measures rendered it possible to fix accurately the time of commencement of the disease. The agglutination reaction of each serum was tested against seven strains of the Shiga bacillus and one of Flexner's bacillus. Counting as positive the cases where agglutination was visible to the naked eye after 24 hours incubation in a dilution of 1 in 25 he found 4 cases positive out of 15 on the fourth day and more than half before the tenth day.

F. E. T.

ADAM (A.) *Antikörper im Ruhrstuhl.* [Antibodies in Dysentery Stools]—*Cent. f. Bakt.* 1 Abt. Orig. 1918. Sept. 21. Vol. 82. No. 1. pp. 3-13. With 1 fig.

Adam examined dysentery stools for the presence of agglutinins and bactericidins. The stools were diluted from 10 to 100 or 200 times with normal saline solution and centrifuged. The agglutinating and bactericidal powers of this saline extract were then investigated. Both substances were often found to be present, but were neither sufficiently constant or specific to be of any real practical value in diagnosis. In the stool they bore no parallelism to their presence in the blood, being sometimes present in the stools when absent from the blood and *vice versa*. This appears to indicate that the antibodies found in the stools were not a mere filtrate from the blood but were produced locally in the intestine. Whether they were manufactured by the tissues of the intestinal wall or by the richly cellular exudate within its lumen was not determined.

F. E. T.

D'HERELLE (F.) *Sur le rôle du microbe filtrant bactériophage dans la dysenterie bacillaire.*—*C.R. Acad. Sci.* 1918. Dec. 9. Vol. 167. No. 24. pp. 970-972.

D'Herelle supplements the preliminary note previously published in which he describes a filter passing microbe which he found in the dejecta of patients convalescent from bacillary dysentery. The mode of action and the precise rôle of this organism in the evolution of disease has been more completely studied with an improved technique by the systematic examination of the stools of thirty-four patients infected with the dysentery bacillus of Shiga, several of whom have been examined daily from the commencement of the disease to the end of convalescence. This organism is possessed of bacteriophagic properties which render it antagonistic to dysentery bacilli. It pre-exists in the intestine where it normally lives at the expense of *B. coli*.

The pathogenesis and pathology of bacillary dysentery are dominated by two factors acting in opposite directions, namely, the dysentery bacillus, the pathogenic agent, and the filter passing bacteriophage, the immunising agent. Experiments on rabbits have shown that the

cultures of the bacteriophage microbe exhibit both preventive and curative powers. The same organism is invariably present in the intestines of patients whose symptoms are improving. D'Herelle therefore proposes the administration of active cultures of this bacteriophage microbe in the treatment of bacillary dysentery at the first appearance of symptoms of the disease.

F. E. T.

DITTHORN (Fritz) & LOEWENTHAL (Waldemar). **Erfahrungen mit unserem multivalenten Ruhrschutzzimpfstoff "Dysmosil"** (Sammelreferat).—*Hyg. Rundschau*. 1918. Aug. 1. Vol. 28. No 15. pp. 517-521.

Dysmosil is the name given by the authors to a dysentery vaccine made from various strains both of the Flexner-Y and the Shiga-Kruse groups of dysentery bacilli. It has been used fairly extensively and the records of several German observers are here collected, which show that this vaccine, although containing the highly toxic Shiga-Kruse bacillus, is readily borne without producing any serious reactions either local or general. Two injections of 0.5 to 1.0 cc. and 1.0 cc. are usually administered subcutaneously, though doses of 4 cc. have been given without producing any more severe reactions than the smaller doses. Dysmosil appears to be an effective prophylactic, although immunity is only slowly produced, requiring 2 to 3 weeks to reach its height, and protection lasts from 2 to 8 months.

F. E. T.

BISCHOFF (H.). **Erfahrungen mit dem Ruhrschutzzimpfstoff Dysbakta (Boehneke) bei der Ruhrbekämpfung.** [Experience with the Dysentery Vaccine Dysbakta (Boehneke) in the Control of Dysentery].—*Ztschr. f. Hyg. u. Infektionskr.* 1918. Dec 17. Vol 87 No 3. pp 315-342

Bischoff analyses the effects of the injection of Boehneke's Dysbakta in 15,000 men and considers that by its threefold inoculation epidemics of dysentery can be rapidly brought to an end and that it is of great value as a prophylactic and should be made obligatory for the troops between the months of June and August, the reactions produced being as a rule slight and the duration of the immunity produced being reckoned at three months.

F. E. T.

MIXED AND UNCLASSIFIED DYSENTERY.

BAHR (Philip H.) & YOUNG (John). **War Experiences in Dysentery, 1915-18.**—*Jl. Roy. Army Med. Corps*. 1919. April Vol 32. No. 4. pp. 268-275.

Bahr and Young criticise various papers which have been published from time to time dealing with dysentery as it occurred in the Egyptian Expeditionary Force, and they suggest that those responsible for the

health of communities or areas in countries where dysentery is endemic should pay attention to the following points —

"(1) Blood and mucus stools with or without tenesmus, mean dysentery, and at the earliest possible moment an experienced pathologist should report on the nature of the exudate

N B —Amoebae may not be found at first examination, but at least the exudate will indicate the probable type of the disease.

(2) If immediate microscopical diagnosis is impossible, give a moderate dose of anti-dysenteric serum and base further treatment on the result of laboratory findings when procured Further serum treatment depends on the result of the initial dose.

"(3) In amoebic cases emetine treatment must be consistent and a minimum of twelve grains given in daily doses of one grain each

"(4) Whatever the type of case treated by emetine or serum is only slightly more important than treatment by rest and dieting

F E. T.

COWAN (John M.) & MILLER (Hugh). *Dysentery—A Clinical Study.*—*Jl. Roy. Army Med. Corps.* 1918. Sept–Oct. Vol. 31. No. 3 No. 4 pp 217–228; 277–295.

This is a somewhat discursive account of dysentery chiefly in its clinical aspects, as observed by the authors in some 600 cases which were admitted into the dysentery wards of the General Hospital at Alexandria between May 1916 and February 1917 Entamoebae were discovered in the stools in more than 58 cases, a dysentery bacillus in 132 cases and Lambha in 50 cases They believe that the protean aspect of intestinal amoebiasis is not sufficiently recognised and that it is often associated with bacterial infection The treatment consists in the administration of ipecacuanha or emetine in sufficient doses over a sufficient length of time, and the discomforts produced by the administration of large doses of ipecacuanha by the mouth led to the almost universal use of emetine administered hypodermically

They also found the symptoms of bacillary dysentery quite as varied and confusing as those of the amoebic variety, the whole picture—the facies, the toxæmia, the fever, etc—being that of an acute bacterial infection in which gastro-intestinal symptoms are prominent They confirm the findings of MACKIE who recognises three stages in the stools of acute dysentery from the bacteriological standpoint. In the first dysentery bacilli are present; in the second they have disappeared, but the flora is abnormal, such organisms as *B. Morgan* and *B. faecalis alkaligenes* being present; in the third *B. coli* is predominant In many cases of clinical dysentery no dysentery bacilli were found, and agglutination by the serum of patients was so uncertain that no conclusion can be reached. Although in a few cases valuable aid was given by laboratory investigations, in the great majority of cases the clinician must act without reference to bacteriological or microscopic findings

They gave antidysenteric serum in bacterial cases with prominent toxic symptoms in doses of 40 to 80 cc. repeating the dose as seemed indicated. Their largest single dose was 140 cc. They observed good results follow its administration, but they have also seen equally good results in cases where no serum was administered, and they are convinced that the general treatment of a case is of much greater importance than the administration of serum. Arthritis (exclusive of serum arthritis) occurred in seven cases.

F. E. T.

WATT (James C.). **Remarks on Dysentery in East Africa.**—*Jl. Trop. Med. & Hyg.* 1919. Mch. 15. Vol. 22. No. 6. pp. 45–48. With 1 fig.

Watt relates his experiences of dysentery in East Africa under active service conditions from May 1916 to January 1918, having been for the most part of that time in the field with fighting units. The period May 1916–December 1916 was of particular interest, as during this period Watt was attached to white troops most of whom were new to the Tropics. He summarises his remarks as follows:—

“(1) That amoebic dysentery has been a much more common infection in recent campaigns than is generally believed.

“(2) (Hypothetical) That bacillary dysentery is frequently secondary to amoebic ulceration of the bowel

“(3) That microscopic examination of dejecta of dysenterics should be made on the earliest possible date after the onset of symptoms.

“(4) And that each [?] such] examination is more reliable than any subsequent examination can be in determining the nature of the initial cause of ulceration of the bowel.

“(5) Maximum activity of *E. histolytica* is only likely to be observed in the early stages of the most acute cases under suitable conditions of temperature, &c.

“(6) Treatment with emetin and other means not generally sufficiently prolonged in original attacks to allow of complete healing of ulcerations.

“(7) A minimum of fifteen days' treatment with emetin gr 1 subcutaneously each day is suggested as a routine method, followed if necessary, by further emetin treatment by the mouth.

“(8) That the toxic effects of emetin have been exaggerated.”

F. E. T.

SANGIORGI (Giuseppe). **Dissenterie in Albania.**—*Pathologica.* 1919. Apl. 1. Vol. 11. No. 249 pp. 141–144.

In 1918 Sangiorgi carried out the examination of 2,349 cases of dysentery among Italian soldiers and prisoners of war in Albania. The majority of the cases were bacillary in origin, Shiga infections predominating over Flexner infections. In fact the Shiga bacillus was the most frequent of all the dysentery-producing agents in Albania. In many cases brilliant successes were obtained by serum therapy. Cases due to *Entamoeba*, to *Lamblia*, and to *Balantidium* were also observed and during the year cases of dysentery associated with *Trichomonas intestinalis* and with *Tetramitus mesnili* were not rare.

F. E. T.

FINDLAY (C. Marshall). **The Differential Diagnosis of Amoebic and Bacillary Dysentery from the Blood.**—*Lancet.* 1919. Jan. 25. pp. 135–136.

By the employment of two reactions which occur in the polymorphonuclear leucocytes, namely the iodine reaction and the production of nuclear pseudopodia, Findlay has attempted to arrive at a simple method of differential diagnosis of amoebic and bacillary dysentery from an examination of the blood. He considers that, taken in conjunction, these two tests enable an accurate diagnosis of the type of dysentery to be given at an early stage of the disease in at least 90 per cent. of cases. The occurrence of a well-marked iodine reaction

without the formation of nuclear pseudopodia suggests a bacillary infection. The presence of nuclear pseudopodia with absence of the iodine reaction suggests an amoebiasis. Where both reactions are positive a mixed infection is probably present.

F. E. T.

SCHWERINER (F) *Zur Diagnose und Epidemiologie der Ruhr* [The Diagnosis and Epidemiology of Dysentery]—*Berlin Klin Woch* 1918. Mch 11. Vol. 55. No 10. pp 236-239.

Schweriner points out that from observations made during the war the bacteriological diagnosis has become somewhat discredited. In stool examinations the rapid overgrowth of dysentery bacilli by saprophytic organisms renders their identification difficult and uncertain. This overgrowth is favoured by warmth and may be considerably checked by the application of cold, so that stools in transit for investigation should be ice-packed. Treatment of the patients with calomel, bismuth, bolus, animal charcoal, and tannalbin, &c, may render the identification of dysentery bacilli in the stools almost impossible. The prolonged discharge of bacilli in carriers will be found in a considerable percentage of cases, and for the examination of the stools treatment by these medicaments should be interrupted. The administration of an aperient is recommended prior to collecting the sample of stool for examination. The chances of success will be considerably improved by sending the material for examination as early and as rapidly as possible.

F. E. T.

ORTH (Johannes) *Ueber Colitis cystica und ihre Beziehungen zur Ruhr*. [On Colitis cystica and its Relation to Dysentery]—*Berlin Klin Woch* 1918. July 22. Vol. 55. No 29. pp 681-687. With 5 figs.

Orth divides cystic colitis into two groups:—

(1) Colitis cystica superficialis, where small retention cysts occur in the mucous membrane of the intestine superficial to the muscularis mucosae. This variety occurs at any age as a sequel to any chronic superficial inflammatory lesion of the intestine and therefore is not special to dysentery. It is comparable with gastritis cystica superficialis and with pyelitis cystica.

(2) Colitis cystica profunda, where heterotopic cysts are found beneath the muscularis mucosae. They comprise (a) submucous retention cysts arising from atavistic intranodular glands, (b) submucous retention cysts unconnected with lymph nodules and (c) submucous cysts arising from the newly formed mucous membrane lining cavities produced by ulcerative processes which, though not confined to dysentery, are most commonly encountered in this disease.

F. E. T.

RAUTMANN (Hermann). *Ueber Ruhr*.—*Med. Klinik*. 1918. Nov. 17. Dec. 1. Vol. 14. Nos. 46 & 48. pp. 1136-1138; 1187-1189.

Three distinct clinical forms of acute dysentery are described by Rautmann, namely: (1) A proctitis-sigmoiditis form in which the

lower segment of the large intestine is chiefly involved without obvious clinical implication of the upper part of the colon or of the small intestine. This corresponds to the ordinary clinical picture of dysentery and comprised the majority of the cases seen by Kautmann. It is the form most amenable to treatment, showing little tendency to chronicity. (2) An entero-colitis form in which the lower segment of the large intestine is chiefly affected but with wellmarked clinical involvement of the upper segment and also of the small intestine. This is not a very frequent form. It shows most tendency to chronicity because of the large extent of the lesions both in the large and small intestines and because of the inaccessibility of these lesions to treatment, which accounts for the chronic dyspepsia. (3) A typhlitis form which produces predominating symptoms although it is not very frequent. The differential diagnosis of this form is most important as cases of this kind may be mistaken for appendicitis. They do not, as a rule, require surgical treatment and a knowledge of them is required in order to prevent unnecessary operation.

F. E. T.

HART (C). *Pathologisch-anatomische Beobachtungen über Ruhr.*
[Observations on the Pathological Anatomy of Dysentery.]—
Med. Klinik 1918. May 19. Vol. 14. No. 20. pp. 488-490.

Hart bemoans the fact that in the extensive war literature on dysentery so much attention has been given to its clinical and bacteriological aspects to the exclusion of its morbid anatomy. His own observations are based on the post-mortem examination of cases in all stages of the disease from the more acutely toxic to those ending in chronic cachexia. In the majority of the cases the inflammatory changes in the intestines were confined to the large intestine, seldom extending to the small intestine. They comprised variable combinations of catarrhal, follicular, diffuse necrotic and pseudo-membranous inflammatory changes in the mucosa. In the most acutely toxic cases death often occurred before any changes were visible in the intestine, except great swelling and redness of the mucous membrane. These cases of rapid death from intoxication are to be explained either by increased toxicity of the infecting organisms or by increased susceptibility on the part of the patient, but evidence of either view cannot be obtained at autopsy.

In acute cases showing signs of meningismus hyperaemia and oedema of the brain and pia mater are present, whilst in two cases with epileptiform onset adhesion of the meninges to the frontal lobes of the brain was found. Hyperaemia and oedema of the brain were also observed in cases with renal cirrhosis and it is doubtful whether these conditions were due to uraemia or to the dysenteric infection.

Gastric and other haemorrhages, including those into the skin and gums may also be produced in the severe toxæmias of dysentery, and peptic ulcers of the stomach and duodenum may be due to the same cause. Where lesions of the gums are present "scorbutic dysentery" results.

Secondary changes in dysentery may be grouped under three heads, viz. :—(1) Where pseudo-membranous and necrosing processes are

found in the alimentary or respiratory tracts, (2) Bacteræmia with secondary invasion of the blood stream from the ulceration in the large intestine, and (3) peritoneal infection with local or general suppurative peritonitis, with or without perforation of the dysenteric ulcers

F. E. T.

YASUDA (Shuho), SHIMBO (Masuho), SATO (Tohru) & TAKEUCHI (Kiyoshi) Ueber die Pathologie und pathologische Anatomie der "Ekiri" und der Kinderdysenterie in der Fukuokagegend. (Vorläufiger Bericht.) [On the Pathology and Pathological Anatomy of "Ekiri" and Dysentery in Children in the Neighbourhood of Fukuoka.]—*Verhand. Japan. Path. Gesellsch.* 1917. Apl. 6. Vol. 7. No. 4. pp. 96–102.

In order to investigate the pathological and anatomical changes found in "Ekiri" and in the dysenteries of children the authors made a careful study of 166 cases, comprising 64 cases of "Ekiri," 63 of dysentery in children and, for comparison, 22 cases of dysentery in adults and 17 cases of status lymphaticus

In the intestine similar inflammatory and ulcerative changes were found with similar distribution, both large and small intestine being affected in "Ekiri" in 84 per cent and in the dysentery of children in 91 per cent. of the cases. The thymus, lymph glands and spleen are also enlarged in both these diseases and to a similar degree, being less than that found in status lymphaticus, the pathological changes being quite analogous, with only minor differences due to the duration of the disease and the degree of toxic absorption. In the suprenals there were hyperplastic changes in the zona glomerulosa with slight interstitial round celled infiltration, the medullary cells being swollen and proliferated with slight mononuclear round celled infiltration in the medullary substance in the acute stages of both diseases. In status lymphaticus there was hypoplasia of the medulla in 73 per cent., whereas in Ekiri and children's dysentery this hypoplasia was only present in 18 per cent, these changes indicating that these two diseases had no relationship to status lymphaticus.

F. E. T.

KRYONO (Kenji) & OKUBO (Nacyoshi). Ueber die pathologisch-anatomischen Veränderungen der Magen und Darmschleimhaut bei der Dysenterie und "Ekiri" der Kinder. [On the Pathologico-Anatomical Changes in the Gastric and Intestinal Mucosa in Dysentery and "Ekiri" in Children.]—*Verhand. Japan. Path. Gesellsch.* 1917. Apl. 6. Vol. 7. No. 4. pp. 102–104.

In the Southern provinces of Japan there has raged from ancient times summer epidemics of an acute disease of children of unknown causation, producing, especially in children from 2 to 5 years of age, diarrhoea and acute toxic manifestations (high fever, convulsions, coma, collapse, albuminuria etc.) This disease is known as "Ekiri."

The author points out the similarity of the anatomical changes produced in the alimentary tract by "Ekiri" and by dysentery, when the latter affects the small intestine as it so frequently does in young children. He also investigated experimentally in animals of different

ages (dogs, rabbits, fowls and pigeons) the effects on the intestines of subcutaneous or intravenous injection of a suitable dose of dysentery toxin. In the adult animals an intense catarrhal or necrosing inflammation of the mucous membrane of the large intestine, caecum and appendix was produced. In newborn dogs or rabbits the mucous membrane of the duodenum and upper portion of the jejunum was affected in the same manner; in young animals of about 20 days the jejunum and in animals of 40 to 60 days the lower end of the jejunum and the caecum were similarly affected

F E T.

LUITHLEN (Friedrich). *Pemphigus acutus*. (Blasenausschlag bei Sepsis und Dysenterie.) Heilung durch Aderlass und Eigenserum. [Pemphigus acutus (Formation of Bullae in Sepsis and Dysentery) Recovery by Venesection and Autoserum.]—*Wien. Klin. Woch.* 1918. Dec. 5. Vol. 31. No. 49 pp. 1297-1298

Luithlen records two cases of acute pemphigus in adults. One occurred during septic infection from paronychia of the thumb, the other during an attack of dysentery due to the Y bacillus. In the former case haemolytic streptococci were obtained in pure culture from the bullae. In the second case the bullae, and in both cases the blood, were sterile. On the intravenous injection of 20 cc. of autoserum obtained by venipuncture and the withdrawal of 100 cc. of blood rapid recovery ensued.

F. E. T.

JOLTRAIN (Edouard), BAUFLE (Paul) & COOPE (Robert). Certain Chronic Colopathies: Origin and Clinical Evolution.—*Lancet*. 1919. May 31. pp. 933-935.

Joltrain, Baufle and Coope point out that chronic colopathies constitute the majority of chronic intestinal affections observed during the war among soldiers hospitalised in gastro-enterological wards. In 73 out of 102 cases of chronic colitis an initial acute stage was noted as follows:—

Amoebic dysentery	..	..	..	in 38 cases.
Bacillary dysentery (type Shiga)	.	..	3	..
Acute dysentery (nature unknown)	..	..	24	..
Gastro-intestinal influenza	..	..	4	,
Intoxication by gas	..	..	4	..

Thus in 65 out of 73 cases chronic colopathy followed an acute dysentery or acute dysenteriform colitis, whilst the remainder also showed an acute toxic or infective origin. The treatments applicable to acute dysentery are useless in the chronic sequelae. It is therefore important to defeat the tendency of these forms of acute colitis to pass into a chronic stage. Along with the specific treatment during the acute stage, it is necessary not to neglect, during convalescence, the disinfection of the intestine, not only by intestinal antiseptics, but more particularly by a severe food régime, so conceived as to avoid intestinal fermentations and putrefaction

F. E. T.

CARLES (Jacques). *Les enterites chroniques de guerre. Leur diagnostic. Leur traitement.*—*Presse Méd* 1919. Feb. 10. Vol. 27 No. 8 pp 67-70. With 5 figs.

Carles draws attention to the large numbers of [French] combatants who present themselves for treatment with gastroenteric symptoms. These gastro-intestinal maladies are of very varied etiology having been acquired over a very wide area, some in France, others in Salonika, the Dardanelles, Morocco, Tunisia, Tonkin and Cambodia. They are accordingly divided into the following categories according to their causation :—

(1) Those consequent upon a chronic amoebiasis. They are recognised by the presence of dysenteric amoebae or their cysts in the stools and can be cured by the administration of the double iodide of emetine and bismuth.

(2) Those due to intestinal infection with various parasites, e.g. *Lamblia*, *Cercomonas*, *Tetramitus*, *Trichomonas* or more rarely *Ancylostoma*, *Tricocephalus*, *Ascaris* etc. These intestinal manifestations readily yield to sulphur, thymol, turpentine, male fern, etc. according to the variety of the parasite.

(3) Rarely they are remote sequels of paratyphoid fever or bacillary dysentery. The recto-colic ulcers present in these cases are most effectively treated by local applications controlled by rectoscopy. Injections of anti-dysenteric serum or paratyphoid vaccine-therapy may be necessary for their cure.

(4) Those due to functional digestive insufficiency.

(5) Those due to excessive intestinal fermentations, whether saccharolytic or proteolytic.

(6) Those consequent upon an abdominal sympathosis.

(7) Multiple associations of the above conditions are not infrequently met with and demand a complex line of treatment. To ensure therapeutic success precise diagnosis of the etiological factor is indispensable in every case of chronic enteritis. This can only be accomplished by making a thorough clinical examination together with a rigorous coprological investigation.

F. E. T.

BRUENING. *Ein Fall von Darmverschluss nach Ruhr.* [A Case of Intestinal Obstruction after Dysentery.]—*Munch. Med. Woch.* 1919. Feb. 21. Vol. 66. No. 8. pp. 213-214.

Three months after an attack of dysentery complicated with malaria a man of 22 developed the signs and symptoms of intestinal obstruction. Rectal examination revealed a circular obstruction suggesting a carcinoma of the rectum. An artificial anus was made and the patient died of sepsis. In addition to healing ulcers in the large intestine, autopsy revealed a sharply defined mass of proliferated mucosa in the region of the sigmoid flexure. As histological examination of the proliferated mass could not be carried out its exact nature could not be ascertained.

F. E. T.

COTTE (M.). De l'appendicostomie suivie de lavages au nitrate d'argent dans le traitement des dysenteries aiguës rebelles.—*Bull. et Mém. Soc. Méd. Hôpt. de Paris.* 1919. Feb. 20. Vol. 35. No. 7. pp. 119-122.

Having previously published five cases with four successes of appendicostomy followed by lavage with silver nitrate solution for intractable acute dysentery Cotte now publishes two further successful cases and considers that this procedure constitutes an interesting and useful therapeutic measure in cases of acute dysentery which prove resistant to the ordinary medical methods of treatment

F. E T

DUFOUR (Henri) La salicaire [*Loosestrife*] dans la diarrhée des nourrissons, l'entérite et certaines dysenteries des adultes.—*Bull. Acad. Méd.* 1919. April 22. Vol. 81. No. 16. pp. 507-508.

Dufour draws attention to the remarkable effects obtained in cases of the diarrhoea of nurslings and of adults, including bacillary dysentery, but excluding amoebic dysentery and tuberculous enteritis, by the use of a remedy formerly employed but now almost forgotten. This is a fluid extract of the plant *Loosestrife* of the Natural Order *Lythraceae*, which is administered to nurslings in doses of 50 to 60 centigrammes and to adults in doses of 3 to 4 grammes in twenty four hours.

Dufour believes that the tannin and possibly other constituents of the plant exert a specific selective action on the mucosa of the large intestine

F. E T

LABBÉ (M.). Les entérites à *Lamblia* intestinal.—*Presse Médicale* 1919. Mch. 27. Vol. 27 No. 18 pp. 161-162.

The literature dealing with the pathogenicity of *Lamblia* is reviewed and various lesions found in animals, especially rodents, by other observers are discussed. The author states that he believes the parasite to be pathogenic. Cases are recorded of *Lamblia* infection, some pure infections and some associated with the presence of pathogenic amoebae. The resistance of the parasite to treatment by the drugs used in amoebic dysentery infections is demonstrated. [It is not stated whether bacteriological examinations were carried out during the investigation. The paper contains no new evidence of pathogenicity of the parasite.]

F. W. O'C.

SPRUE.

ELDERS (C) Over de Behandeling en de Oorzaken van Indische Spruw en Daarmee waarschijnlijk Aetiologisch Verwante Symptomen-Complexen. [The Causation and Treatment of Indian Sprue and Other Symptom-Complexes of probably Allied Aetiology]—pp 42 [No date or publisher]

The author maintains that sprue is a deficiency disease and not either an infection or a toxæmia. He gives detailed histories of eight cases, all of which recovered under dietary treatment. The patients were put on a diet of which milk, beef half cooked in butter, strawberries and green vegetables were the chief ingredients, carbohydrates being at first either prohibited altogether or very much restricted. The power of some patients to deal with lactose is so much diminished that milk is at first not well borne and must be withheld for a time. The author, who is described as Physician for Tropical Diseases at The Hague, draws attention to the fact that in four of his patients who were born in the Dutch East Indies, sprue first manifested itself on their visiting Europe. It is, of course, well known that Europeans are the chief sufferers in the East Indies and the author suggests that the explanation of these converse facts is that Europeans in the East Indies and persons born in the latter visiting Europe do not know how to diet themselves suitably. The "symptom-complexes of probably allied aetiology" are pellagra and pernicious anaemia, both of which are, in the author's opinion, deficiency diseases.

F. S. A.

BASSETT-SMITH (P. W.) A Case of Sprue associated with Tetany.—*Jl. Trop. Med & Hyg.* 1919. Feb. 1. Vol. 22. No. 3. pp. 21-25 & *Lancet.* 1919. Feb. 1. p. 178.

Bassett-Smith records the first case of tetany in sprue although it has been frequently noted in other diseases of the digestive system. The patient was a male aged 45, who contracted the disease in China—probably at Shanghai—in 1911-13. In July 1918 he was admitted to the Royal Naval Hospital at Plymouth weighing only 84 lbs. and on Sept. 19, 1918, to the Dreadnought Hospital at Greenwich. He showed signs of improvement under treatment, but on Sept. 23rd. he complained of slight cramps in the right hand and wrist, which were relieved by warmth. On the following day there was a severe attack of tetany affecting chiefly the right upper extremity. The spasm spread up the arm and across the chest, with marked trismus and risor sardonicus, and the right leg was slightly affected. The spasm was quickly relieved by the subcutaneous injection of ether and there was no return of the tetany, but the general condition did not improve and fourteen days later the patient died of heart failure.

F. E. T.

PATTERSON (J. B.) Symptoms and Treatment of Sprue.—*China Med. Jl.* 1918. Nov. Vol. 32. No. 6. pp. 514-521.

Patterson practicing in Korea considers that sprue is a serious and not uncommon disease in that country. He records eleven cases

stating that he has himself been a sufferer from it. The commonly accepted view that sprue usually occurs after 40, being rarely seen under 35, is questioned by the author, who has suspected sprue in several children he has seen with prolonged sickness in which no definite diagnosis can be made. Although the disease is usually so insidious as to be years in declaring itself after the first infection it sometimes begins with symptoms so acute that it may be mistaken for dysentery or cholera. The cause of sprue is believed to be the yeast identified by ASHFORD [*Monilia psilosis* Ashford]. The treatment is largely dietetic and has been greatly improved by the use of salvarsan and its substitutes, and of sodium cacodylate in addition to emetin. The signs of improvement in the order of their occurrence are (1) a comfortable feeling in the abdomen after eating and a clean taste in the mouth, (2) gain in weight and (3) a dark-coloured stool.

F. E. T

REVIEWS.

VIOLLE (H.) (de l'Institut Pasteur) **Le Choléra. Préface de E. Roux.**
—vii + 624 pp. With 100 figs. 1919. Paris: Masson & Cie.
[Price 20 frs.]

A monograph, whose completeness in respect of all knowledge, even the most recent, on the subject is altogether admirable, the only serious defect being the absence of a comprehensive index. The illustrations are also hardly worthy of the work, as photographs of bacteriological apparatus and cultures rarely succeed in conveying the information intended.

It is a pity, too, that the author has not considered it advisable to include literature references, at any rate to the newer work which is still sub judice, as the book is undoubtedly one which will prove indispensable to all those engaged in the study of the subject.

The bacteriological side of the volume, as was to be expected in a contribution by M. Violle, is particularly well presented.

H. Schütze.

GHOSH (J. C.) [B.Sc., F.C.S.]. **Indigenous Drugs of India, Their Scientific Cultivation and Manufacture, With Suggestions for the Development of New Industries.**—pp. 32. 1919. Calcutta: Butterworth & Co., Ltd. (India).

India, like other countries, experienced a great scarcity of drugs in the course of the War. The writer of this pamphlet points out that most of the plants which are the source of drugs of proved value grow or can be cultivated in India owing to its variations of climate and soil and that their cultivation should be undertaken. Moreover a body of trained chemists is needed to examine the properties of such drugs in use in India as are found of value in hospitals and physiological laboratories. Private firms would undertake the manufacture of the products. As medicinal plants indigenous to India, the properties of which, he believes, are not inferior to the imported article, he instances belladonna, digitalis, hyoscyamus, jalap, podophyllum, Nux vomica seeds, the source of strychnine, are exported though the strychnine might be extracted in India. Ipecacuanha has been raised in India. By culture the alkaloidal content of a plant may be improved. Close co-operation of manufacturing department and drug culture department will be essential. Finally the author points to the desirability of a "Food and Drugs Act" for India. An appendix gives a list of vegetable drugs recognised in the British Pharmacopoeia in nine (vernacular) languages; it is stated that half of these are indigenous to India or Ceylon.

This is without doubt a useful brochure. It seems curious that Mr. Ghosh does not suggest utilising the experience, chemical and other, which has been acquired in India in the manufacture of quinine from Indian grown cinchona.

A. G. B.

CLARKE (J. Tertius). **Phthisis: An Infectious Disease.**—pp. 16
1919. Kuala Lumpur: Printed at the Federated Malay States Government Press.

The object of this little pamphlet, written for people living in the Federated Malay States, is, in the words of the author, to show the public that phthisis is an infectious disease and that the sources of infection are either dried or sprayed expectoration. Bovine tuberculosis need not be considered for it does not exist. Among 250,000 pigs killed in the last 4 years no case was found. Moreover the Chinese, who are more easily infected than Malays or Indians, seldom take milk.

It is stated that there is more tuberculous disease in Malaya than in England. Whereas in England 10 per cent of deaths are due to tuberculosis, in Perak the percentage is 6.8 and in Singapore 16; "malaria causes half the total deaths" in the State of Perak.

The measures to check the spread of the disease are not considered.

A. G. B.

TROPICAL DISEASES BUREAU.

TROPICAL DISEASES
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[No. 3.

TYPHUS.

VUILLET (H). Note on the Epidemic Diseases observed in Roumania during the Campaign of 1916-17.—*Lancet*. 1919. Apr. 5 pp. 569-570.

Typhus fever had consequences incomparably more grave than any of the other epidemics which attacked the Roumanian Army in the Autumn of 1916, and its occurrence was not recognised until the beginning of December. The writer finds it difficult to trace the origin of the epidemic. Two hypotheses seem equally reasonable, either that it was brought from Hungary or Transylvania by the invading Roumanian troops, or that it was carried into Roumania by the Russian Army. Numerous investigations undertaken to discover the causal agent were without result, but well-defined rules of prophylaxis were established both for the Army and the civil population. The epidemic attained its maximum of extension and gravity in March 1917, at which time the mortality exceeded 50 per cent. From the spring onwards and during the fine season, typhus gradually died out.

H. F. Bellamy.

PHILIPPSTHAL. Epidemiologische und hygienische Mitteilung über eine Fleckfieberepidemie. [A Typhus Epidemic.]—*Ztschr. f. Hyg. u. Infektionskr.* 1918. Dec. 17. Vol. 87. No. 3. pp. 451-467. With 10 figs.

A summary of records dealing with an epidemic of typhus at Focsani a town in Roumania (population about 24,000), during the German occupation. The period covered is from March 1st 1917 to Feb. 28th 1918. Before the war, in the unanimous judgment of the local Roumanian doctors, there had been no typhus in the place, it came with the war, and probably with the first Roumanian and Russian prisoners. The mortality of the whole epidemic was 26·3 per cent.

H. F. B.

MARTINI (Erich). **Fleckfiebersterblichkeit einer christlichen und juedischen Bevoelkerung.** [Typhus Mortality in a Christian and Jewish Community]—*Deut. Med. Woch.* 1918 Nov. 21. Vol. 44. No. 47. pp 1300-1301

The writer draws attention to the greater immunity and diminished mortality from typhus fever enjoyed by Jews as against Christians. He is in agreement with other observers in stating that from childhood Jews are more infested by lice than Christians, and apparently acquire thus an early immunity from the consequences of bites. The lower mortality among women he attributes to the fact that they give up earlier than men and thus arrive more speedily under medical treatment.

H. F. B.

DEVAUX (A.). **Nervous Complications of Exanthematic Typhus.**—*Lancet.* 1919. Apr. 5. pp 567-569.

A study of post-typhus nervous complications admitted to the Neurological Centre at Jassy during the winters of 1916-17 and 1917-18, from which it would appear that the unknown infective agent has a very particular predilection for nervous tissues. The clinical forms are numerous and varied. During one period of seven months at Jassy 215 cases were collected and classified.

H. F. B.

LIPPMANN (Heinrich). **Polyneuritis nach Fleckfieber.** [Polyneuritis following Typhus.]—*Deut. Med. Woch.* 1918. Dec 19. Vol. 44 No. 51. pp. 1425-1426.

An account of a case of polyneuritis following typhus seen by the writer while engaged on special work at the fortress hospital at Danzig. A month after the onset of typhus, during convalescence, the patient suddenly complained of inability to raise the left arm. The shoulder joint was free but there was atrophy of deltoid and pectoral muscles. Frequent complaint was made of great pain in the left half of the cranium. Later there was paresis of the left half of the face and dropping of the angle of the mouth. Gradual partial recovery.

H. F. B.

HELLIG (G.). **Ueber Liquorbefunde bei Fleckfieber und ihre differentialdiagnostische Bedeutung.** [The Cerebro-spinal Fluid in Typhus and its Significance in Diagnosis.]—*Muench. Med. Woch.* 1918. Dec. 17. Vol. 65. No. 51. pp. 1434-1435

A description of changes in the cerebro-spinal fluid observed by the writer in typhus. Attention is drawn to the following points.—

1. Increased pressure (not invariable).
2. Cellular-polymorphism.
3. Leuco-lymphocytosis.
4. The occurrence of "seal-rings" seated on the leucocytes and small mononuclear lymphocytes.

H. F. B.

HÄHN (Georg) **Erfahrungen mit Pyramidon bei der Behandlung des Fleckfiebers.** [Pyramidon in the Treatment of Typhus Fever]—*Muench Med. Woch.* 1919. Feb. 11. Vol. 66. No. 7. pp. 179-180

Thirty-two cases of typhus were treated by the writer with Pyramidon (15 grains per diem in five 3 grain doses). He is of opinion that the course of the disease was mitigated and the mortality lowered.

II. F B

NICOL (Kurt). **Pathologisch-anatomische Studien bei Fleckfieber.** [The Pathological Anatomy of Typhus]—*Beitraege z. Path. Anat. u. z. allgem. Path.* 1919. Jan. 23 Vol. 65 No 1 pp. 120-147 With 1 plate & 4 figs.

This work was carried out on about one hundred cases of typhus dying in practically every stage of the disease, and forms a fairly exhaustive study of the finer pathological anatomy of the vascular lesions of typhus. The writer's conclusions are best given in full :—

"Anatomically speaking, typhus is a disease of the small vessels of the systemic circulation. The pathological changes reveal themselves as characteristic processes in the arterioles and arterial capillaries, and have an endo-vascular origin in proliferation and necrosis of the endothelium and intima with formation of circumscribed perivascular nodules. In fact, the terms of Arterioliitis and Periolitis nodosa may be applied.

"The sites of predilection of the disease are the vessels of the skin and central nervous system, and in a secondary degree also the musculature of the heart. The most decisive spot for investigation from the point of view of the histologist is the brain in the neighbourhood of the olive, but the smaller vessels of all organs may be the seat of the above changes.

"The histological findings are constant, and are to be observed in all cases of clinical typhus. That they are specific for the disease is proved by animal experiment. The whole clinical symptom-complex is to be explained by the anatomical changes.

"Histogenetically, the morbid processes comprise a combination of proliferative, and inflammatory changes.

"The nodule formation undergoes for the most part retrogressive changes and in the brain these reach their conclusion in the formation of small cicatrices.

"Death results in the early stages from the local processes in the central nervous system, in conjunction with those in the heart muscle (disseminated interstitial myocarditis).

"In 50 per cent of cases, complications arise, chiefly in the organs of respiration, which form in the overwhelming majority of cases the cause of death in the later stages.

"Secondary infections, chiefly streptococcal, are frequent (20 per cent.).

"Typhus gangrene is to be attributed in the main to vaso-motor damage, and predisposes to rapid septic infections (septic thrombosis).

"In spleen and bone marrow are found, even in the early stages, a high degree of myelosis.

"There is an absence of characteristic or specific macroscopic findings in typhus; it is only by means of the microscope that the anatomical diagnosis can be made with certainty."

H. F. B.

JAFFÉ (Rudolf). Zur pathologischen Anatomie des Fleckfiebers. IV. Zur Pathogenese des Fleckfeberknoetchens. [The Pathogenesis of the Vascular Nodules of Typhus.]—*Med. Klinik*. 1918. Dec. 8. Vol. 14. No. 49. pp. 1209-1211.

The fourth of Jaffé's papers setting forth the results of painstaking researches on this subject. In the present communication he draws a parallel between the degenerative changes observed in the epithelial cells of the interior of the louse infected with *Rickettsia* and those seen by him and other observers in the vascular portions of various organs of patients dead from typhus. Putting together the facts hitherto gathered on the subject of *Rickettsia* as a possible causal agent of typhus, Jaffé summarises much as follows. *Rickettsia* is ingested by the louse during the act of suction; the middle portion of the intestinal tract is invaded and multiplication of the organism takes place in the epithelial cells until the latter burst and their contents are extruded into the lumen of the tract. Fresh cells in other portions of the tract are then attacked in their turn, and so on until the process ceases spontaneously, probably owing to the acquisition of immunity by the louse. The same sequence of events in all probability occurs in the endothelium of the blood vessels of human organs (liver and brain) where similar changes have been seen to take place.

H. F. B.

ZUELZER (G.) Die Untersuchung des Exanthems bei latentem Fleckfieber und bei Malaria nach der Weiss'schen Kapillarbeobachtungsmethode. [Examination of the Capillaries by Weiss's Method in Latent Typhus and Malaria.]—*Muench. Med. Woch*. 1918. Dec. 10. Vol. 65. No. 50. pp. 1401-1402

An account of the writer's experience of the method of WEISS and HANFLAND for examining the eruptions of typhus and other diseases under a low-power objective for diagnostic purposes. (Described in *Muench. Med. Woch.*, 1918 No. 23.) The changes seen in cases of typhus are said to be characteristic and consist of stasis and engorgement in the venous capillaries. The method is alleged to be of value in the so-called "latent" cases unaccompanied by fever.

H. F. B.

MONZIOLS (A.) & DUBOURG (E.). Agglutination du *Proteus* X₁₉, dans le typhus exanthématique.—*C.R. Soc. Biol.* 1919. April 5. Vol. 82. No. 10. pp. 348-350.

The interest of this communication lies in the scarcity of research on B. X₁₉ outside Germany and Austria. Using the technique of WEIL and FELIX, the writers obtained positive reactions in all the 19 cases of typhus submitted to the test. On the other hand, negative results followed in 85 tests on cases comprising the most diverse conditions other than typhus. A positive result in typhus was obtained as early as the third day and persisted until a variable time after complete recovery. The titre was generally about 1-1000; in four cases it exceeded 1-10,000. The writers consider the reaction of value, the more so since other laboratory methods of diagnosis fail.

H. F. B.

BRAUN (H.) & SALOMON (R.). *Die Fleckfieber-Proteus-Bazillen* (Weil und Felix). *Ihr Verhaeltnis zueinander und zu Nicht-Fleckfieber-Proteus-Staemmen.* [The Typhus-Proteus-Bacilli (Weil-Felix) Their Relationship to One Another and to Non-Typhus-Proteus-Strains.]—*Cent. f. Bakt.* 1. Abt Orig. 1918 Nov 11. Vol. 82 No. 3-4. pp. 243-257.

By absorption tests the writers show that the agglutinins for X_{10} and X_2 present in a typhus patient's serum are not identical; in other words, that the serum contains a special specific agglutinin for each organism. The remainder of the paper is devoted to the serological inter-relationship of the three groups into which they divide the proteus family, and an enumeration of the many points of divergence in serological behaviour of X_{10} and X_2 artificial immune serums and typhus patients' serum.

H. F. B.

WERNER (H.) & LEONEANU (E.). *Zur Serologie des Fleckfiebers, insbesondere über Immunisierung mit Proteus X_{19} .* [The Serology of Typhus, with Special Reference to Immunisation with Proteus X_{19} .]—*Muench. Med. Woch.* 1918. Dec. 5. Vol. 65. No. 49. pp. 1377-1379.

A continuation of previous work on the same subject. [Reviewed in No. 2, Vol. 13 of this *Bulletin*.] The writers find the limits of the dose required for the production of the Weil-Felix Reaction in the human subject to be 0.2-0.5 cc. of a suspension of a 24-hour-old agar culture in 10 cc. of saline. Local reactions may appear with a dose of 0.5 cc. of this suspension. On testing the human immune serum thus obtained, the Proteus X_{19} agglutinin was found to be destroyed by a temperature of 65° C. There was marked diminution of the agglutinating power of the serum after absorption by X_{19} . Coagglutination was found to occur with *B. typhosus*.

H. F. B.

WELTMANN (O.) & SEUFFERHELD (N.). *Ueber Erhöhung der Empfindlichkeit der Weil-Felixschen Reaktion durch Zuechtung des X_{19} auf Traubenzuckeragar.* [On Increasing the Sensitiveness of the Weil-Felix Reaction by Cultivation of X_{19} on Glucose Agar.]—*Wien. Klin. Woch.* 1918. Dec. 26. Vol. 31. No. 52. pp. 1373-1375.

The writers find that when grown on glucose agar, X_{19} invariably assumes its O-form, and if then used for the purposes of the Weil-Felix Reaction the resulting agglutination is more diagnostic than when the organism is grown on ordinary agar. By controls with non-typhus blood the writers have convinced themselves that the specificity of the reaction is not impaired.

H. F. B.

PAPAMARKU. **Beitrag zur Frage der Weil-Felixschen Reaktion und der Paragglutination.** [The Weil-Felix Reaction and Paragglutination] —*Ztschr. f. Hyg. u. Infektionskr.* 1918. Dec. 17. Vol. 87. No. 3. pp. 468-474.

The aim of a series of experiments by Papamarku was to cultivate ordinary proteus strains in such a manner that they became transformed into X-strains. The method employed was one of continuous cultivation of the ordinary proteus in broth mixed with various dilutions of serum from typhus patients. After several generations of growth thus the organism was transferred to ordinary agar and its agglutinability by the same serum observed. Apparently the desired result was but incompletely achieved and nothing conclusive was the outcome of the experiments.

H. F. B.

SCHIFF (F.). **Zur Agglutinabilität des Weil-Felixschen Bazillus** [The Agglutinability of the Bacillus of Weil-Felix].—*Muench. Med. Woch.* 1919. Feb. 7. Vol. 66. No. 6. pp. 152-155.

The writer's experiments lead him to some practical conclusions on this subject. Lowered agglutinability of B. X_{10} may be due to deficiency of sugar in the culture medium. On the other hand too much sugar leads to spontaneous agglutination. Suspensions of the bacillus which have lost their agglutinability by heating to 58° C. can be rendered again agglutinable by washing with normal saline. Cultures heated to 100° C. for two minutes are as a rule readily agglutinated, but their agglutinability is also dependent on the composition of the medium employed. Moreover, such agglutinability does not always correspond to that of live cultures.

H. F. B.

MOELLERS (B.) & WOLFF (G.). **Experimentelle Fleckfieberuntersuchungen.** [Experimental Investigation of Typhus].—*Deut. Med. Woch.* 1919. Mch. 27. Vol. 45. No. 13. pp. 349-351.

Dealing with the rôle played by proteus in typhus, the writers conclude from their investigations that as no protection against the disease is conferred by inoculation of X_{10} it cannot be regarded as the causal agent. Guinea pigs infected with typhus yield a negative Weil-Felix reaction, yet the virus is found in the blood and in all organs during the stage of fever. The incubation period varies from 5 to 21 days. Animals of 200 to 300 grms. weight are recommended for experiment as heavier animals are less sensitive.

H. F. B.

SCHUERER (J.) & WOLFF (G.). **Ueber die Bedeutung der Proteus-Bakterien beim Fleckfieber.** [On the Significance of Bacillus Proteus in Typhus].—*Cent. f. Bakt.* 1. Abt. Orig. 1919. Mch. 25. Vol. 82. No. 7. pp. 517-528.

Using ox bile as a culture medium, the writers succeeded in cultivating proteus from the blood of patients 20 times out of 260, i.e., in 7.7 per cent. They believe the organism to be present in the blood

stream in a state unsuitable for growth in artificial media, and this fact accounts for the small number of cases in which it is recoverable. When successful, they found proteus of both X_{10} and X_2 types and also ordinary saprophytic proteus. In the urine proteus was found in 137 out of 450 examinations. The Weil-Felix reaction is regarded by them as the expression of a mixed infection. The disease produces an invasion of proteus normally present in the intestinal tract. They are unable, either on morphological or cultural grounds, to distinguish between *Proteus vulgaris* and the X strains. Serologically, however, while X_2 shows transition forms, X_{10} is distinct from all other strains of proteus.

H. F. B.

CSÉPAI (Karl). *Fleckfleberdiagnostikum oder frische Suspension.* [Typhus "Diagnosticum" v. Fresh Suspension.]—*Muench. Med. Woch.* 1919. Jan. 24. Vol. 66. No. 4. pp. 99-100.

A short paper advocating the use of a prepared permanent suspension (Dauerdiagnostikum) of X_{10} in the technique of the Weil-Felix reaction. The suspension is prepared by washing off an agar culture of a readily agglutinable strain with normal saline containing 0.5 per cent. phenol, and then heating to a little over 60° C. for two hours in a water-bath.

H. F. B.

STARKENSTEIN (E.) & ZITTERBART (R.). *Experimentelle und klinische Untersuchungen über das Verhalten gleichzeitig anwesender Antigene und Antikörper.* [Experimental and Clinical Investigation of the Behaviour of simultaneously present Antigens and Antibodies.]—*Wien. Klin. Woch.* 1918. Dec. 12. Vol. 31. No. 50. pp. 1317-1323. With 1 chart.

A technical paper, the subject of which centres around the phenomenon termed by MICHAELIS "competition of Antigens." The primary object of the writers is apparently to uphold the specificity of the Gruber-Widal reaction in the face of apparent inconsistency due to the positive results so often seen in undoubted typhus infections. A large amount of experimental evidence is collected to show that in those cases where high-grade non-specific reactions occur side by side with the specific reaction these are not due to the specific antigen but owe their origin to the febrile condition. Further, that when *B. typhosus* and *B. X₁₀* are injected simultaneously into an animal, the agglutinin formed by the latter as compared with that formed when it is injected alone shows no appreciable variation. On the other hand,—the formation of typhoid agglutinin is sometimes inhibited, and this inhibition is particularly well marked when the X_{10} injection follows the typhoid injection, the typhoid agglutinin often disappearing altogether. When, however, the X_{10} agglutinin is already fully developed in the blood subsequent immunisation with typhoid undergoes no noteworthy restriction. The last part of the investigation is devoted to an examination of the behaviour of agglutinins present simultaneously in the blood in respect of their passage into the other body-fluids and into the foetus from the mother.

H. F. B.

OTTO (R.) & DIETRICH. *Beitraege zur experimentellen Fleckfieberinfektion des Meerschweinchens.* [The Experimental Infection of the Guinea Pig with Typhus Fever.]—*Cent. f. Bakt.* 1. Abt. Orig. 1918. Dec. 12. Vol. 82. No. 5. pp. 383-400.

A study of the pathological effects of typhus virus upon the guinea pig. The virus was obtained from various sources, epidemics in Germany and Poland, and from DA ROCHA LIMA's laboratory in Hamburg where it had been preserved by repeated animal passage.

As a rule defibrinated or citrated blood was used, but serum, washed corpuscles and even organic extracts were found to be possible means of conveying the virus. To produce successful results it was necessary to inoculate with material obtained during the acute stage. Clinically, the animals suffered from fever and malaise; *post mortem*, there was moderate enlargement of the axillary and inguinal glands, swelling and injection of the adrenals and small haemorrhagic infarcts in lungs and liver. As a rule there was no splenic enlargement. Microscopically were found the usual small perivascular infiltrations seen in the human subject, and "encephalalitic" nodules. Apparently the workers were harrassed by "mixed infections," which sometimes obscured their results. The tests of successful infection were (1) ability to reproduce the same train of symptoms by inoculation of the blood into the peritoneal cavity of another guinea pig, and (2) immunity of the animal to further infection.

H. F. B.

VAN HOOGENHUIJZE (C. J. C.). *Zur Aetiologie des Fleckfiebers.* [Aetiology of Typhus.]—*Cent. f. Bakt.* 1. Abt. Orig. 1918. Nov. 11. Vol. 82. No. 3-4. pp. 258-264.

A communication of interest. The writer, Acting Director of the Municipal Health Department at Amsterdam, reports the results of laboratory investigations in two cases of typhus occurring in that city in February 1917. Blood culture in one of the cases yielded a gram-positive diplobacillus which was subcultured and thoroughly examined. The organism was agglutinated by the patient's own serum and by that of another typhus patient in a dilution of 1:100; the serums of three non-typhus patients were positive in a dilution of 1:25. Injected into guinea pigs a rise of temperature occurred after four or five days, with other signs of illness, and immunity for the injected animals was conferred. From lice actually on the patient at the time of admission to hospital organisms were also cultivated which van Hoogenhuijze thinks are probably identical with the one obtained by blood culture and with *Rickettsia prowazeki* of DA ROCHA-LIMA.

H. F. B.

NICOLLE (Charles) & LEBAILLY (Charles). *Essai de conservation des virus exanthématique et létérique chez la Sangsue.*—*C.R. Soc. Biol.* 1919. May 3. Vol. 82. No. 12. pp. 417-419.

In this experiment a leech was placed on the shaved skin of one of the infected guinea pigs used in the Pasteur Institute at Tunis for perpetuating typhus virus. After filling with blood, the leech was

placed in fresh water and two days later about 1 cc. of blood withdrawn from the digestive tract by puncture. After dilution with saline this blood was injected into the peritoneal cavity of another guinea pig. The same process was repeated after four days with the same leech and a second guinea pig. The first guinea pig contracted experimental typhus, but not so the second. With another leech and guinea pig the experiment was repeated with an eight-day interval, and this animal likewise failed to become infected. The writers are of opinion that this method of preserving the virus offers no advantage over those already tried

H. F. B.

NICOLLE (Charles). *Second serie d'observations relatives à la sensibilité du cobaye au virus exanthématique et à l'entretien sur lui de ce virus.*—*Arch. Inst. Pasteur de Tunis*. 1918. Dec. Vol. 10. No. 4. pp 275-280.

An account of the procedure adopted at the Pasteur Institute at Tunis to preserve the three strains of typhus virus possessed by the Institute by means of repeated passage through guinea-pigs

H F B.

BORREL, CANTAOUZÈNE, JONESCO-MIHAESTI & NASTA. *Sur un microbe capsulé, trouvé chez le pou et l'homme atteints de typhus. Culture du microbe.*—*C.R. Soc. Biol.* 1919. May 17. Vol. 82 No. 14. pp. 501-506 With 3 figs.

The object of the research here described was to discover what happened to lice when allowed to feed on the blood of typhus patients at the height of the disease. Out of 35 lice, 5 became infected, one non-fatally with a non-capsulated cocco-bacillus, and 4 fatally with a large capsulated coccus. The latter was cultivated and studied. It resembled an organism isolated post-mortem from a typhus patient dying of intense meningeal symptoms. The writers do not claim a specific rôle in the aetiology of typhus for their organism, but are convinced that it plays an important part in the complications of the disease.

H. F. B.

DA ROCHA-LIMA (H.). *Schutzimpfungsversuche gegen Fleckfieber.* [Experimental inoculation against Typhus.]—*Muench. Med. Woch.* 1918. Dec. 24. Vol. 65. No. 52. pp. 1454-1456.

In this paper da Rocha-Lima tabulates the results of experiments on guinea-pigs inoculated with attenuated typhus virus obtained from infected lice. He regards the outlook as promising, and thinks this source of an inoculum superior to all others including human blood. The method is unfortunately unsuitable for inoculation on a large scale owing to the difficulty of obtaining sufficient material, but might well be applied in the case of persons exposed to special danger of contracting the disease.

H. F. B.

OTTO & ROTHACKER. Zur Fleckfieberschutzimpfung. [Anti-Typhus Inoculation]—*Deut. Med. Woch.* 1919. Jan. 16. Vol. 45. No. 3. pp. 57-59.

In the course of thirteen months some 750 soldiers and others were inoculated against typhus fever. The inoculum used consisted of blood aseptically drawn from typhus patients, chiefly during the eruptive stage, but also at periods up to four days after the fall of temperature. After separation of the clot the blood was put up in 5 cc. tubes. Trifling local reactions occurred in a small percentage of cases, and the occurrence of general reactions, consisting of headache, malaise and rise of temperature, is also noted. The writers state that they could find no evidence of protection having been conferred by the method. On the other hand, the mortality among inoculated cases was considerably lower than among non-inoculated.

H. F. B.

MOELLERS (B.) & WOLFF (G.). Die bisher mit der Fleckfieberschutzimpfung gemachten Erfahrungen. [Protective Inoculation against Typhus].—*Zeitschr. f. Hyg. u. Infektionskr.* 1919. Vol. 88. No. 1. pp. 41-65. With 10 figs.

According to the writers, inoculation against typhus is as harmless to the human subject as that against typhoid or cholera. Although not conferring absolute protection, statistics are favourable as regards incidence and mortality. The material used was the pooled blood from several typhus patients, defibrinated and mixed with normal saline in the proportion of four parts of blood to one of saline. This was thoroughly tested for sterility and a preliminary series of inoculations carried out on guinea-pigs, with the usual result of producing experimental typhus. In the later series of human inoculations each person received three injections into the pectoral region; on the first day 2 cc., on the fourth day 2 cc., and on the seventh day 4 cc. Later, formalin was added to the inoculum for preservative purposes. Of 650 persons inoculated in this manner 6 contracted typhus within three months, and 5 at periods varying from three to eight months. One patient died. On the evidence of their animal experiments the writers recommend reinoculation after three months. The paper bears the imprint of careful study of the subject.

H. F. B.

- i. RAHMET BEY (H. T. M. K.). Typhus Fever. *Med. Record*, 1919. Jan. 11. Vol. 95. No. 2. Whole No. 2514. pp. 47-52.
- ii. FRIEDBERGER (E.). Fleckfieberepidemien in Pommern. [Epidemics of Typhus in Pomerania]. *Ztschr. f. Hyg. u. Infektionskr.*, 1918. Dec. 17. Vol. 87. No. 3. pp. 475-540.
- iii. MARTINI (Erich). Gegen die Fleckfiebereinschleppung ueber oestliche Grenzbahnhoeefe. [Precautions against the Introduction of Typhus over the Eastern Frontier]. *Deut. Med. Woch.*, 1919. May 8. Vol. 45. No. 19. pp. 525-526.
- iv. HOFFMANN. Flecktyphusansteckung nach Entscheidung des Reichsgerichts Unfallfolge. [Accidental Infection with Typhus in the Light of the Decision of the Courts.] *Muench. Med. Woch.*, 1919. April 26. Vol. 66. No. 17. pp. 470-471.
- v. SCHURER (Johannes). Zur Fruehdiagnose des Fleckfiebers. [The Early Diagnosis of Typhus]. *Muench. Med. Woch.*, 1918. Dec. 24. Vol. 65. No. 52. pp. 1460-1461.

- vi JUERGENS. Fleckfieberbekämpfung. [Stamping out Typhus]. *Deut. Med. Woch.*, 1918. Dec 19. Vol 44. No. 51. pp. 1426-1427
- vii. WOLFF (Georg). Fehlerquellen der Weil-Felix-Reaktion. [Sources of Error in the Weil-Felix Reaction]. *Muench. Med. Woch.*, 1919 May 9. Vol. 66 No. 99. pp. 507-509.
- viii. SCHILLING (Viktor). Das Zusammenwirken von Blutbild und Weil-Felix-Reaktion bei der Laboratoriumsdiagnose des Fleckfiebers. [The Conjunction of Blood-picture and Weil-Felix Reaction in the Laboratory Diagnosis of Typhus]. *Muench. Med. Woch.*, 1919. May 2. Vol. 66. No. 18. pp. 486-487.
- ix. BIEN (Z.). Zum Gebrauche des Alkohol-Fleckfieber-Diagnostikums mit *Bac. typhi exanthematici* Weil-Felix und zur Erklarung der Reaktion [The Use of an Alcoholic Typhus Diagnosticum with an Explanation of the Weil-Felix Reaction]. *Wien. Klin. Woch.*, 1919. Jan. 30. Vol. 32. No. 5. pp 115-117.
- x KOEHLER (C.). Ein Beitrag zur Serologie des Fleckfiebers. [The Serology of Typhus.] *Arch. f. Schiff- u. Trop Hyg*, 1918. Dec. Vol. 22. No. 24 pp. 433-438.
- xi FABRIA (O. G.) Bacteriology of Typhus. *Gaceta Med. de Mexico*, 1916. July-Dec. Vol. 11. No. 7-12. p. 239. [Published Sept. 1918.] [Summarised in *Jl. Amer. Med. Assoc.* Vol. 71. p. 1782]
- xii. MOURE (Paul) & SORREL (Etienne). The Surgical Complications following Exanthematic Typhus *Lancet*, 1919. Mar. 1. pp. 341-344
- xiii. MARTINI (Erich). Fleckfiebergangraen an ungewoehnlicher Stelle. [Typhus Gangrene in an unusual Site]. *Deut. Med. Woch.*, 1919. Jan. 9. Vol. 45. No. 2. p. 41. With 1 fig.
- xiv. MEYER (F.). Zur Fleckfieberbehandlung. [Treatment of Typhus Fever]. *Deut. Med. Woch.*, 1919. Feb. 6. Vol. 45. No. 6. p 157.
- xv. MEYER (F.). Zur Fleckfieberbehandlung. [Treatment of Typhus] *Deut. Med. Woch.*, 1919. Apr. 3. pp 381.
- OTTO (von R.). Zur Fleckfieberbehandlung. [Treatment of Typhus]. *Deut. Med. Woch.*, 1919. Apr. 3. pp. 380-381.
- i. A good epitome of current knowledge of typhus fever.
- ii. A long and detailed account of various outbreaks of typhus in Pomerania resulting from the importation of Polish and Russian agricultural labourers during the war. The writer concludes by giving a list of measures and precautions which should be taken at the frontier in order to ensure the cleanliness and freedom from lice of these people.
- iii. This communication reflects the uneasiness felt in Germany concerning the possibility of a generalised outbreak of typhus Martini sketches a scheme for carrying out disinfection from lice on the eastern frontier.
- iv. A dissertation on the subject of insurance against the contraction of typhus by German medical men.
- v. The writer discusses various points, psychic and haematological, whereby he claims to be able with some degree of certainty to diagnose typhus fever in its earliest stages.
- vi. Juergens draws attention to the danger of the spread of typhus to the civil population arising from the demobilisation of lice-infested soldiers, and suggests the measures which, in his opinion, would obviate this danger.
- vii. The sources of error disclosed appear to be those attendant on all sero-diagnosis
- viii. A description with examples of the writer's method of differential leucocyte counting by which a large proportion of all neutrophils are shown to possess a pathological character in cases of typhus. It is claimed that an early diagnosis may be made by the method.
- ix. Notes on the use of an alcoholic typhus "Diagnostikum" (X_{19}) prepared by the Sero-Therapeutic Institute in Vienna. Nothing new is offered on the subject of the explanation of the reaction.
- x. Contains nothing new or of special interest.
- xi. The original is not available. The summary states that "Fabria was unable to cultivate from the blood of fourteen typhus patients any bacillus resembling in the least Plotz's *Bacillus typhi*."

xii. A summary of the writers' work in the French Hospital at Jassy during the epidemic of typhus in 1917. Most of the surgical complications appear to have been suppurative conditions due to the micro-organisms of secondary infections, and particularly to the streptococcus.

xiii. A short description of a fatal case of typhus, a female age 43, admitted to the Central Hospital for Typhus at Wloclawek in November 1918. A novel feature of the case was the presence of gangrenous patches on the face in addition to those on the extremities

xiv. A note on the treatment of typhus with Optochin-Camphor whereby the mortality sank to below 10 per cent

xv. Short notes on the treatment of typhus by Optochin-camphor.

H. F. B.

HELMINTHIASIS

DE BEAUREPAIRE ABAGAO (Henrique). *Novo methodo para facilitar o diagnostico e a conservação dos embryões de filarias no sangue e de parasitas nas fézes.* [A New Method for Facilitating the Detection and Preservation of Filaria Embryos in the Blood and of Parasites in the Faeces.]—*Brazil Medico.* 1919. Jan. 4. Vol. 33. No. 1. pp. 1-2.

The technique advocated consists in submitting the material to the action of a liquid, which is at once a preservative of parasites and cells, a stain for the greater part of these elements, and a solvent of the blood cells. The formula is as follows:—

Gentian violet ..	0 1 grs.
Chloride of sodium	0 35 „
Distilled water	100 „
Acetic acid	0 3 „

This solution is very like that of THOMA, differing from it in the smaller proportion of acetic acid. For its use in the diagnosis of human and animal filariae, five cubic centimetres of the solution are placed in a test tube or in a small glass vessel with a stopper, to this is added half a cubic centimetre of the blood in which filariae are to be looked for and the whole is well shaken.

Owing to the presence of acetic acid in the solution the erythrocytes are dissolved, the nuclei of the leucocytes are stained violet and the same happens, though more slowly, in the case of the cellular elements of the filaria embryos, which are rendered clearly visible and stained a more or less intense violet. If the filariae are not numerous in the material it is advisable to centrifuge the liquid and search for the parasites in the deposit.

The acetic gentian-violet has the further advantage of preserving the filariae in perfect condition for some months, so that the material can be kept for demonstrations or for further examination.

For diagnosis of parasites present in the faeces 2 cubic centimetres of the acetic gentian-violet solution are employed to emulsify $\frac{1}{2}$ cubic centimetre of the material to be examined. The solution possesses the property of preserving satisfactorily for some months (stained or not as the case may be, but always clearly defined) the ova and larvae of worms commonly present in faeces, which also show up clearly in the medium used.

F. S. Arnold.

LYON (M. W.). *Intestinal Parasites during a Year at the Walter Reed General Hospital.*—*Jl. Amer. Med. Assoc.* 1919. Feb. 1. Vol. 72. No. 5. pp. 326-327.

From Oct. 1917 to Oct. 1918, 477 samples of faeces were examined for intestinal parasites. These came from 163 individuals and 56 per

cent of them were found to be free from all parasites. The results are tabulated :—

Parasite.	No. of Cases	Percentage of Frequency of the parasite.	Percentage of persons infected.
<i>Necator americanus</i>	28	34.2	17.2
<i>Stongyloides stercoralis</i>	7	8.5	4.3
<i>Taenia saginata</i>	5	6.1	3.1
<i>Ascaris lumbricoides</i>	4	4.9	2.5
<i>Trichuris trichiura</i>	3	3.7	1.8
<i>Hymenolepis nana</i>	2	2.4	1.2
<i>Oxyuris vermicularis</i>	1	1.2	0.6

[Certain Protozoa are also given in the original Table but these have been eliminated above]

R. T. Leiper

McCLANAHAN (H. M.). Intestinal Parasites in Children.—*Jl. Amer Med. Assoc.* 1918. Aug. 24. Vol. 71. No. 8. pp. 623-625.

In dealing with the occurrence of intestinal parasites in children the author summarizes the conclusions of other writers. The public attribute all manner of symptoms to intestinal parasites while the physicians as a class minimize their importance. The author has for several years applied what he calls the therapeutic test. The child is given a cathartic in the evening, a light supper and no breakfast, and in the morning the treatment is instituted viz. a combination of santonin and calomel or the fluid extract of spigelia and senna. The remedy is combined with syrup of blackberry. A brisk cathartic of castor oil or magnesium citrate is then given. For oxyuris the author advises small doses of santonin and calomel, usually four doses, one hour apart, followed by a cathartic. Each night the mother applies a salve composed of mercurial ointment 2 drams and benzoated lard 2 drams. An infusion of garlic (for which 2 bulbs are sliced and boiled in a pint of water and strained) may be given for a week and then resumed after an interval of three weeks.

R. T. L.

LUCKE (Baldwin). Statistical Study of the Prevalence of Intestinal Worms in 35,000 White and Colored Troops at Camp Zachary Taylor, Kentucky.—*Milit. Surgeon.* 1919. June. Vol. 44 No. 6. pp. 620-625.

Over 35,000 soldiers were examined in the course of the investigation recorded in this paper. Of these 26,672 were white and all these were residents of Kentucky. Of the 8,653 coloured soldiers 6,948 came from Kentucky, 865 from Alabama and 840 from Tennessee. Practically all were between 18 and 42 years of age, in good physical condition and presumably in good health as they were on active service. 10.4 per cent of the white soldiers and 1.1 per cent, of the coloured

troops were found to be infested. This difference is apparently due to race since the proportion is maintained in the various countries regardless of topography. Multiply infestations occurred only among the whites.

Relative Frequency of Intestinal Worms among White and Negro Troops.

Species.	White troops 26,672.		Coloured troops 8,653		Ratio of per cent infestation.	
	Number parasites	Per cent parasites	Number parasites	Per cent. parasites	White : Negro	
<i>Necator americanus</i> .	926	3.47	24	0.28	12.1	1
<i>Necator</i> and <i>ascaris</i>	130	.49	—	—	—	—
<i>Necator</i> and <i>trichuris</i>	51	.19	—	—	—	—
<i>Necator</i> , <i>ascaris</i> , and <i>trichuris</i> ..	24	.09	—	—	—	—
<i>Necator Americanus</i> (total) ..	1131	4.24	24	.28	15.4	1
<i>Ascaris lumbricoides</i> .	1067	4.00	44	.51	7.8	1
<i>Ascaris</i> and <i>necator</i> ..	130	.49	—	—	—	—
<i>Ascaris</i> and <i>trichuris</i> .	63	.24	—	—	—	—
<i>Ascaris</i> , <i>necator</i> , and <i>trichuris</i> ..	24	.09	—	—	—	—
<i>Ascaris lumbricoides</i> (total) ..	1284	4.82	44	.51	9.4	1
<i>Trichuris trichiura</i> ..	268	1.00	5	.06	16.6	1
<i>Trichuris</i> and <i>ascaris</i>	63	.24	—	—	—	—
<i>Trichuris</i> and <i>necator</i>	51	.19	—	—	—	—
<i>Trichuris</i> , <i>ascaris</i> and <i>necator</i> ..	24	.09	—	—	—	—
<i>Trichuris trichiura</i> (total) ..	406	1.52	5	.06	25.3	1
<i>Hymenolepis nana</i> ..	210	.79	22	.25	3.1	1
<i>Hymenolepis</i> and <i>tri-</i> <i>churis</i> ..	6	.02	—	—	—	—
<i>Hymenolepis nana</i> (total) ..	216	.80	22	.25	3.5	1
<i>Taenia saginata</i> ..	12	.04	—	—	—	—
<i>Strongylodes</i> ..	16	.06	—	—	—	—
All parasites (total) ..	3065	11.49	95	1.10	10.4	1

R. T. L.

KOBAYASHI (H.). Studies on the Lung Fluke in Korea.—*Mitt der Medizinischen Fachschule zu Keijo*. 1918.

In many districts of Korea lung-distomiasis is one of the most important diseases. The development of the embryo from the one celled stage, at the time of expectoration, to the full grown miracidium occupies from twenty to thirty days. In July and August under the most favourable circumstances 16 days sufficed. From March to April from 50 to 60 days were necessary. The optimum temperature is 25° to 30° C. NAKAGAWA surmised that *Melania* was the first intermediate host but afterwards admitted that the forms taken by him to be developmental stages belonged to some unknown fluke.

The miracidia, in experimental work, vigorously attack *Melania gottschaei*, *M. nodiperda* var *quinaria* and *M. extensa* and the author believes that the genus *Melania* is probably concerned in the metamorphosis of *Paragonimus* though the cercariae found in specimens collected in the natural habitat may not be those of the lung fluke. In Korea the second intermediaries are *Eriocheir japonicus* and *Astacus* (*Cambaroides*) *similis*. A very full description of the encysted larva, as found in the crayfish, is given. In a series of notes on the structure of the adult worm it is pointed out that beneath the muscles of the body wall subcuticular cells are often found mingled with the parenchyma cells and have often been taken by previous writers for dermal glands or vitelline cells. Of the excretory system only two large branches of the collecting canal can be seen half way between the ventral suckers and the posterior end. The eggshell is oval, the blunt end being provided with operculum.

The specific differences used by WARD and HIRSCH for the differentiation of *P. ringeri*, *P. kellicotti* and *P. westermanni* are held to be simply individual variations. In Korea there are no specific differences between the lung flukes from man, dog, cat and pig either in the character and arrangement of the cuticular spines, in the size of oesophagus and pharynx or in the curvature of the intestinal coeca which vary somewhat.

R. T. L.

WATSON-WEMYSS (H. L.). **Carcinoma of the Liver associated with Infection by *Olonorchis sinensis*.**—*Edinburgh Med. Jl.* 1919. Feb. N.S. Vol. 22. No. 2. pp. 103-104.

At an autopsy on a French colonial soldier, who was a Chinaman, a tumour about the size of a Tangerine orange was found on the upper surface of the right lobe of the liver. The liver was enlarged and firm, showing numerous white patches on its surface. It was fairly adherent to the diaphragm. A small quantity of pus had formed between the liver and diaphragm. Section of the liver at almost any point resulted in the escape of flukes in numbers; their presence was similarly demonstrated in the pancreas. Numerous hard glands were found in the abdomen chiefly around the head of the pancreas. The tumour was white in colour and densely hard. It proved to be a carcinoma.

R. T. L.

ROMERO SIERRA (J. M.). **Contribución al Estudio de la Parasitología en Venezuela. Estudio y Clasificación de un Dístoma.**—*Jl. Parasit.* 1918. Dec. Vol. 5. No. 2. pp. 80-83.

The paper records the finding of specimens of *Fasciola hepatica* at a post-mortem on a native of Venezuela who had died in the Vargas Hospital.

R. T. L.

FAIRLEY (N. H.). **Bilharziasis: Some Recent Advances in our Knowledge.**—*Lancet.* 1919. June 14. pp. 1016-1021.

The author records a series of important experimental studies on the pathology and symptomatology of bilharziasis. The worms and their eggs exert their deleterious influence on the tissues mainly by

toxic action. This is shown by the early clinical manifestations, the nature of the pathological lesions seen in monkeys dying before the deposition of eggs in the tissues and the type of the cellulo-humeral response. Antibody can be demonstrated in the peripheral blood by means of a specific complement-fixation test. The habitat of the paired worms in *B. haematobia* and *B. mansoni* differs. In the former while they were found in the portal and inferior mesenteric veins, they were present in largest number in the pelvic plexuses of veins, the vesical and the uterine. In the latter, the worms chiefly inhabit the inferior and superior mesenteric veins and the portal system of the liver. Adult *B. mansoni* were never found in the lungs and on *a priori* grounds the author expects that pulmonary lesions are mainly limited to *B. haematobia*. The eggs pierce the vessel wall by the spine but progress thereafter by an active ulcerative process. The morbid anatomy of infected monkeys about the twelfth week is described. In *B. haematobia* the liver is enlarged and congested and studded with whitish tubercles which are in reality minute abscesses of eosinophile cells. The spleen may be enlarged, the colon is frequently thickened and there are subperitoneal and submucous nodules. The bladder shows massive papillomatous formations from 5 to 8 mm. in height. The mucosa is darkened and engorged. In *B. mansoni* infections the characteristic appearance is the large congested liver with whitish nodules. The colon is studded with tubercles or various grades of inflammation of the submucosa may be seen. A complement-fixation reaction obtains in bilharziasis. Infected liver of *Planorbis boissyi* gives an absolutely specific antigen with general technique similar to that utilised for the Wassermann reaction. It affords a valuable index of latent and early infections as well as a guide to the therapeutic efficacy of drugs.

R. T. L.

MILTON (Frank). Note to aid the Search for Schistosomiasis in India.
—*Indian Med. Gaz.* 1919. Apl. Vol. 54. No. 4. pp. 126-130.

As no very definite results have so far attended the search for schistosomiasis in India the author "attempts to show the leading symptoms of the disease as met with elsewhere and to suggest a possible reason why the search in India has so far failed." Eleven species of Bilharzia are known to occur in mammals. The known intermediaries for the Bilharzia worms are listed [the list erroneously includes for *S. haematobium* the molluscs *Planorbis marcoticus* and *P. pfeifferi* and for *S. mansoni* *Planorbis pfeifferi*]. After recounting the clinical features of the various infections in man the author concludes that "When one species of schistosome has gained preeminence in a district or country no other type can thrive there. In India the absence of typical bilharzial infections—either from *S. haematobium*, *S. mansoni* or *S. japonicum*—is ascribed to the presence of a fourth and as yet unidentified species with a distinctive pathology and probably hitherto overlooked or hidden among "Fevers of Uncertain Origin." The author proceeds to name his hypothetical species "*Schistosoma indicum* (*hominis*)."

[The absence of the mollusc genus *Bullinus* from the Indian fauna may indicate an alternative explanation to that put forward in this paper.]

R. T. L.

LUTZ (A.) & PENNA (O.). Studies on Schistosomiasis, made in the North of Brazil, by a Commission from the Instituto Oswaldo Cruz. Report and Travelling Notes. [Also in Portuguese.]—*Mem. Inst. Oswaldo Cruz*. 1918. Vol. 10. No. 1. pp 62-73.

The present Report consists mainly of the diary kept by the Commission sent by the O. Cruz Institute to ascertain the endemic foci of bilharziasis in Northern Brazil. The pupils of the Marine Schools were those chiefly examined but cases in hospitals and other available persons were taken note of. Of 312 specimens examined 71 contained eggs of *Schistosomum*, giving an average of 22.75 per cent. in the Northern States of Brazil. The percentages in each state were as follows :—

Rio Grande do Norte	44 examinations	3 positive	6.81%
Parahyba do Norte	57	3	5.26%
Pernambuco	93	30	32.25%
Sergipe	75	23	30.66%
Bahia	42	12	28.57%

The authors noted also that ankylostome eggs occurred in 85 per cent. of the stools examined in the interior of these Northern States. They "feel sure that at least 70 per cent. of the individuals suffered from ankylostomiasis while the others were only bearers." "It is hard to imagine what will become of these people and their offspring in course of time, if nothing is done against this disease." An account of the Trematode larvae found in the freshwater mollusca is promised later.

R. T. L

LUTZ (Adolpho). On Brazilian Fresh-Water Shells of the Genus *Planorbis*. [Also in Portuguese.]—*Mem. Inst. Oswaldo Cruz*. 1918. Vol. 10. No. 1. pp. 45-61. With 3 plates.

Fourteen species of *Planorbis* are listed. Of these *P. olivaceus*, *P. nigricans*, *P. guadalupensis*, *P. nigrilabris*, *P. melleus*, *P. cimez*, *P. cultratus*, *P. depressissimus*, *P. anatinus* are known species of various subgenera, and the following new species are made by the author :—*P. centimetralis*, *P. incertus*, *P. nigellus*, *segmentina paparyensis*. *P. confusus* is given as a new name for *P. ferrugineus* Spix.

R. T. L.

ITURBE (J.) & GONZALEZ (E.). Quelques observations sur les cereales de la vallée de Caracas. (Premiere partie.)—18 pp. 7 figs. 1919. Laboratorio Iturbe.

These observations deal with the bionomics of *Schistosoma mansoni*, *Fasciola hepatica* and *Paragonimus westermani* in Venezuela. With *S. mansoni* infection through the skin requires a minimum of five minutes. After passage through the heart, lungs, mediastinum to the liver, male worms can be found in the veins of the liver 18 days after infection but the authors have failed to recognise the female worms during the first month after infection. Coupled worms are found

in seven weeks and lateral-spined eggs appear in the faeces of infected animals after two months. The free cercariae are killed usually by a temperature of 48°-50° C. and rarely survive 24 hours. Around the mouth are from 6 to 10 very small points which help to pierce the skin. In the posterior part of the body are 3 pairs of glands which discharge into the mouth. The body measures 0·1 to 0·13 mm. and is 0·04 to 0·05 mm. wide. The tail is 0·14 to 0·15 mm. by 0·02 to 0·025 mm. The prongs of the tail each measure 0·04 to 0·05 mm. in length.

Concerning *Fasciola hepatica* the authors record *Ampullaria luteostoma* as the intermediate host and have successfully infected a guinea-pig and a dog. The larvae after piercing the intestine enter the liver from the abdominal cavity. In South America paragonimiasis has been found in Peru but hitherto has not been recorded for Venezuela. The authors have found cercariae, corresponding to those of *Paragonimus*, in 4 per cent. of the *Ampullaria luteostoma* in Caracas Valley, and the encysted forms in *Pseudothelphusa iturbei* (1 in 130). Dogs were experimentally infected. Paragonimiasis has not been recorded or met with in man in Venezuela but the authors have found infection in the dog and pig.

R. T. L.

CAWSTON (F. G.). Further Observations in regard to South African Cercariae.—*Med. Jl. South Africa*. 1919. Mch. Vol. 14. No. 8. pp. 401-402.

Limnea natalensis is the commonest freshwater mollusc in S. Africa and contains only leptocercous cercariae. Two new names are given, viz.: *Cercaria fulvoculata* and *C. parvoculata* [apparently without reference to forms which have been previously recorded in zoological literature]. Renewed attempts to infect animals are reported.

R. T. L.

CAWSTON (F. G.). Some South African Snails and the Cercariae which attack them.—*S. African Jl of Science*. 1919. Jan-Feb

This short paper summarises the author's findings during the past four years, in which he has examined 3,000 molluscs from various rivers and stagnant pools in Natal and the Transvaal. [The subject matter has already been repeatedly reviewed in this *Bulletin*, and the present paper contains nothing new.]

R. T. L.

BAETZNER (W.). Beitrag zur südafrikanischen Bilharziosis.—*Deut. Med. Woch.* 1919. May 29. Vol. 45. No. 22. pp. 599-600. With 1 fig.

A brief clinical description and cystoscopic examination of a case of urinary bilharziasis in a patient born in Botschebelo in the Transvaal.

R. T. L.

CHRISTOPHERSON (J. B.). **Antimony Tartrate for Bilharziasis: A Specific Cure.**—*Lancet* 1919. June 14. pp 1021-1023.

Antimony tartrate has been used as a routine treatment at the Khartoum Civil Hospital since May 1917 and the author now feels justified in maintaining that it is a specific cure, not only killing the adult *Bilharzia* worms but later also the embryos in the ova in the tissues, and thus eliminates the infected person as a carrier as well as curing him of the disease. In the present paper 30 additional cases are recorded in which the treatment has been satisfactory. The need of caution in the use of the drug is emphasised here as in the author's previous papers. The total amount of antimony tartrate necessary to effect a cure would appear to be less than 25 grs in all. Suspected relapses are due to the gradual elimination of *dead ova*. Eggs will not hatch after about 12 grs. have been given although a marked improvement in the urine is noticeable even on the 5th day when only $3\frac{1}{2}$ grs. in all have been injected. Antimony is cumulative in the tissues. [Details of treatment are given in previous papers, see *Bulletin*, Vol. 13, p. 206.]

R. T. L.

CHRISTOPHERSON (J. B.). **Antimony Tartrate in Bilharziosis and Tachycardia.**—*Brit. Med. J.* 1919. Apl. 19. pp. 480-481

The view that antimony given intravenously produces tachycardia is vigorously combated. This condition is quite common amongst Egyptians and is a common cause of rejection of recruits for the Egyptian Army. "Simple fevers" continued or otherwise are in the author's opinion "frequently due to intestinal parasites—to intestinal sepsis in other words" so the occurrence of tachycardia may be due not to antimony tartrate or at most secondary to it—the symptoms may be due to other parasites than *Bilharzia*. It is mentioned in the paper that *Taenia (Hymenolepis) nana* has often been found literally in hundreds in the faeces of Egyptians at the Khartoum Civil Hospital. Thymol and eucalyptus are ineffectual, but Filix mas given on an empty intestine usually settles this tapeworm. The necessity of a routine examination of faeces in hospitals in tropical countries is emphasised.

R. T. L.

Low (George C.). **A Case of Bilharzial Disease treated by Intravenous Injections of Antimonium Tartaratum.**—*Jl. Trop. Med. & Hyg.* 1919. May 15. Vol. 22. No. 10. pp. 93-94.

A mild case of vesicular bilharziasis has been treated successfully by intravenous injections of tartar emetic. The patient first contracted the disease in Natal in 1905. The symptoms practically disappeared. In 1916 he went to Egypt, then to Salonika. Three months after his arrival in Greece blood began to appear in the urine. He was latterly invalided from France. The injections are tabulated. After $15\frac{1}{2}$ grains in all had been injected over a period of six weeks the symptoms had completely disappeared. The eosinophilia, which on commencement of treatment was 9 per cent. remained high and after the completion of treatment was 12 per cent.

R. T. L.

ARCHIBALD (R. G.) & INNES (A.) **Clinical and Pathological Notes on a Fatal Case of Bilharzia treated by Tartar Emetic.**—*Jl. Trop. Med. & Hyg.* 1919. Apl. 1 Vol. 22 No. 7. pp. 53-54. With 1 plate.

In view of the use of tartar emetic in the treatment of leishmaniasis, trypanosomiasis and bilharziasis, this detailed pathological study is of special interest. The author draws attention to the fatal results which have already followed the use of this drug in kala azar and remarks on a tendency to ignore the existence of the profound blood changes which are present and to depend entirely on the drug to cure the disease by virtue of its specific action on the causal parasites. The pathological changes in the present case were in his opinion attributable to the action of the tartar emetic and were not sequelae of bilharzia, influenza or a previous malarial infection. The treatment carried out appeared intensive and the sudden and fatal sequel was unexpected. That such ending may be due to fat embolism is suggested by the pathological changes present in the liver, kidney and inferior vena cava. [The detailed report should be studied in the original.] The liver cells were very granular and vacuolated. In certain areas the cells had undergone necrosis, some of them contained haemosiderin granules. Sections stained by Marchi's method showed fatty degeneration. No adult worms were found.

R. T. L.

CHRISTOPHERSON (J. B.). **The Cure of Bilharzia Disease by the Intravenous Injections of Antimony Tartrate.**—*Jl. Trop. Med. & Hyg.* 1919. June 16. Vol. 22. No. 12. pp. 113-114

Commenting upon ARCHIBALD and INNES' paper above, Christopherson submits that the case proves nothing at all against the treatment of bilharziasis by antimony tartrate. The man admittedly died of pneumonia and influenza and the changes described in the organs may all be attributed to intestinal parasites. There was moreover a temperature of 105° F. for several days and a pulse of 120. He considers that death resulted from cardiac dilatation rather than from fat embolism.

R. T. L.

CAWSTON (F. G.). **Treatment of Bilharzia Disease.** [Correspondence.]—*South African Med. Rec.* 1919. Apl. 26. Vol. 17. No. 8. pp. 127-128.

The writer quotes a letter from Dr. C. L. LEIPOLDT :—"I am quite certain that drinking water produces the disease [Bilharziasis]; my experimental monkeys easily took the disease in this way." Ross's larvicide is said to be an effective remedy in destroying snails and the cercariae they produce. In August 1918, Dr. LEIPOLDT reported that he had obtained very encouraging results from the injection of pulv. antimonialis, solution 1 in 1,000, into infected monkeys and more recently at Durban a case has been treated with tartar emetic with encouraging results. One point requires further study. Bacilluria may persist and may prejudice a boy's chance of life-insurance long

after the signs of Bilharzia disease have disappeared under treatment. On this ground urinary antiseptics should be combined with antimony in the treatment of the disease.

R. T. L

JOYEUX (Ch.). *Hymenolepis nana* (v. Siebold, 1852) et *Hymenolepis nana* var. *fraterna* Stiles, 1906.—*Bull. Soc. Path. Exot.* 1919. May 14. Vol 12. No. 5. pp. 228-231.

From a study of the morphology, geographical distribution and development of *H. nana* in man and in rats the author concludes that these forms are not identical and proposes to separate them into two distinct species *H. nana* and *H. fraterna*. *H. fraterna* is common and widespread in rodents. The dwarf tapeworm of man is known in all warm countries, in America and in the Mediterranean basin. The author has himself found the parasite once in French Guinea, twice in young Arabs in Algeria and once in a child at Carnot, Algeria, once in Thracian refugees at Salonika and once among sixteen Macedonian children. In temperate regions the distribution of the parasite is very uneven. While the rat parasite is everywhere common it is rare in man. This lack of coincidence favours the view that these two cestodes are not identical. In morphology they are very similar. Differences in length and breadth are too variable to form a basis of differentiation. The genital organs are identical. In the rat tapeworm there are tubercles on the internal shell which are more strongly developed than in the form in man. The shape and number of the hooks are identical but in size they are a little larger in the rat as are also the suckers and the segments. Attempts to infect experimentally man and rat support the view that there is a duality of species and that from the standpoint of medicine the rat does not play a part in the spread of the infection in man.

R. T. L.

FONTAN (Ch.). *Cysticercus bovis* chez l'homme localisé à la région mammaire. *Taenia inermis* de l'intestin. Parasitisme adulte et larvaire chez le même sujet.—*Gaz. des Hôpiti.* 1919. Mch. 6. Vol. 92. No. 12. pp. 183-185. With 1 fig.

The title of the paper explains the chief features of the case it records. The chief point of interest lies in the species of the somatic infection. The cystic worm occurred in the mammary region and measured 8 by 7 mm. The head presented suckers and there was an entire absence of hooks. The cyst was an undoubted example of *Cysticercus bovis*. The patient was also infected with an adult tapeworm belonging to the same species, i.e., *Taenia saginata*. It would appear that the somatic infection followed upon contamination from the faeces of the patient.

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R. T. L.

LEGER (André) & LAVEAU (M.). Ankylostomiasiques : erreurs fréquentes des diagnostics cliniques ; nécessité des examens de laboratoire.—*Bull. Soc. Path. Exot.* 1919. Feb. Vol. 12. No. 2. pp. 90-92.

Recent experience at the Native Hospital at Dakar has impressed upon the authors the need to direct attention again to the close

similarity in clinical symptoms presented by ankylostomiasis with beriberi and other diseases. Sixty Congolese soldiers were erroneously diagnosed during a period of three months in 1918. Not one was reported as ankylostomiasis, the symptoms being usually diagnosed as beriberi, then (?) hydronephritis, malarial cachexia, serous anaemia, dysenteric diarrhoea and cachexia. In the cases which came under the authors' notice there was oedema localised in some to the face and lower limbs but generalised with ascites in others. In the upper limbs and thorax the muscles were much atrophied. The skin and mucous membranes revealed the profound anaemia. There was however a marked absence of cardiac and pulmonary symptoms and of changes in the nervous reactions of the lower extremities. Albumin was never found in the urine. Eosinophilia ranged from 10 to 18 per cent and in one case attained 33 per cent. The red cells were reduced and the haemoglobin fell to 45 per cent. Thymol successfully removed the worms which were of the species *A. duodenale*.

R. T. L.

YEN (F. C.) **Report on Hookworm Infection, Pinghsiang Colliery, Hunan.**—*National Med. J. China*. 1918. Sept. Vol. 4. No. 3. pp. 81-87. With 1 diagram; *Ibid* Dec. No. 4. pp. 140-145.

The report is a first instalment and deals only with a general survey of the colliery. The portions covering the sanitation of the mine and the partial infection survey made to determine the prevalence of hookworm among the groups of employees engaged in different sections and occupations are to appear in a future issue.

R. T. L.

WAITE (J. H.) & NELSON (I. L.). **A Study of the Effects of Hookworm Infection upon the Mental Development of North Queensland School Children.**—*Med. J. Australia*. 1919. Jan. 4. Vol. 1. 6th Year. No. 1. pp. 1-7. With 3 figs. & 2 charts.

The mentality of a group of hookworm-infested children was investigated by means of standardized mental tests and compared with a group of hookworm-free children. The Binet-Simon test modified by GODDARD, the Porteus mazes and a specially modified "dot counting" test designed to measure mental concentration and mental fatigue were used. [The detailed results are tabulated and do not lend themselves to summary.] The authors conclude that hookworm infection produces in growing children severely arrested mental development and considerable mental sluggishness. "Slightly infected children averaged 5.4 months by the Binet and 2 months by Porteus lesser mentality than their hookworm-free associates, while heavily infected children showed by comparison with hookworm-free an average reduction of 19.5 months by Binet and 13.3 months by Porteus. The longer infection lasts the greater is the mental retardation. Mental sluggishness is revealed by all three tests." The authors believe that hookworm is stamping serious mental, physical and sexual degeneracy on 25 per cent. of the total school population from Cooktown to Townsville. They point to the economic loss involved

not merely from social insufficiency but also from the wasted educational effort of 4,000 teachers. Yet at the present time the State of Queensland is spending fifty times as much money on its educational effort as on health activities.

R. T. L.

GONZAGA (Octavio) & LIMA (J. Carvalho). *Campanha contra a Ancylostomose*. [A Campaign against Ankylostomiasis]—*Serviço Sanitário do Estado de São Paulo*. 1918. N.S., No. 1. pp. 95. With 19 plates.

An account of an officially organized campaign against the ankylostomum and other intestinal parasites as carried out at Tremembe in the State of San Paulo, Brazil. Ankylostome infection and many other forms of helminthiasis are extremely prevalent in San Paulo and the scourge has such a serious effect upon the labour power of the State that the Serviço Sanitário decided to deal with the matter by the establishment of posts in different districts, which should serve as centres for statistical investigation and for the organisation of prophylactic and therapeutic measures. The seriousness of the situation may be judged from the fact that 72 per cent of the inhabitants of the district were found by the Rockefeller Commission to be suffering from ankylostomiasis. The posts established by the Serviço Sanitário of San Paulo did not confine their attention to the ankylostomum, as the Rockefeller Commission had done, but undertook the detection and treatment of intestinal worm infections of all kinds. A systematic collection and examination of faeces was started after a census had been taken of the whole area. A posse of clinical assistants (*enfermeiros*) was established to visit every part of the district, taking with them medicines which they administered to the patients in accordance with the directions given, in each individual case, by the medical officers of the post. In the course of the first 3 months, 2,725 primary examinations of faeces were made. Of these 2,399 shewed the presence of the ova of intestinal parasites, while 326 were negative. The following list shews the relative frequency of the different parasites:—

Ascaris	1,757 or 64.47 per cent.
Ankylostomum	1,744 „ 64.00 „
Trichuris	1,452 „ 53.27 „
Strongyloides	200 „ 7.03 „
Taenia	28 „ 1.02 „
Hymenolepis	16 „ .58 „
Oxyuris	9 „ .33 „

The cases of infection by a single species of parasite were:—

Ankylostomum	261
Ascaris	194
Trichuris	120
Strongyloides	15
Taenia	2
Hymenolepis	2
Oxyuris	1

The most frequent associations were —

Ascaris, Trichuris and Ankylostomum	..	720
Ascaris and Ankylostomum	. . .	401
Ascaris and Trichuris	.	275
Trichuris and Ankylostomum	.	184

Other associations were found less frequently than 100 times. The record host was a boy of ten who gave hospitality to ascaris trichuris, ankylostomum, strongyloides, taenia and hymenolepis. In the section on treatment, the drugs discussed are B-naphthol, thymol and chenopodium. Mention is made of a few herbal drugs possessing a local reputation as vermicides but none was found to be of any particular value. As regards the relative importance of remedies the authors state their results as follows :—

Thymol	in 3 doses gave	85·	1 per cent. of cures.
B-Naphthol	„ 3	73· 5	„ „
Thymol	„ 2	63· 4	„ „
Chenopodium	„ 2	50·02	„ „

The largest percentage of cures was due to thymol given 3 times at intervals of 3 days. Next comes naphthol B given on 3 consecutive days. The difference between them is appreciable. The two remedies, however, by no means exclude each other. Naphthol B is better borne, less toxic and cheaper. Thymol is more powerful, not so well tolerated and dearer. The former should be avoided in patients with renal trouble, the latter in cardiac or debilitated patients and in the aged. In their advantages and inconveniences they about balance each other. They should be regarded as allies in any campaign against ankylostomiasis. The lowest percentage of cures is that of chenopodium. It is a passable ankylostomicide but has dangerous toxic properties. Its optimum dosage is still the subject of experiment. It is very sure in its effects on other parasites than the ankylostomum and may justly claim to be regarded as a polyvermicide.”

In the campaign described by the authors prophylactic have gone side by side with therapeutic measures. Lectures, in which the perils of verminoses are pointed out, are given in the rural schools; latrines are provided in the many cases in which there is no accommodation of the kind and endeavours are made to induce the wearing of foot coverings.

F. S. A.

WRENCH (G. T.). Studies in Ankylostomiasis. Nos. 1, 2, 3.—*Indian Jl Med. Res.* 1919. Jan. Vol. 6 No. 3. pp. 393-398 With 3 charts.

No. 1. Thirty-eight percentage of 500 cases in No. 37 Indian General Hospital revealed ankylostoma infection. The author maintains that a cure cannot be presumed merely by the method hitherto deemed sufficient by previous workers. Of 45 cases treated by the author 10 were cured by one treatment, 10 by 2 treatments, 7 by 3 treatments, 7 by 4 treatments, 5 by 5 treatments, 1 by 6 treatments; 4 were not cured by 10 treatments. One was apparently cured by 1 treatment but relapsed on the 51st day. Chenopodium oil is regarded as a dangerous drug. In 151 treatments there were 32 cases of vomiting, many cases of giddiness and occasionally slight collapse. “Research is necessary to determine and standardize what is meant by a cure.”

No. 2. "Manson's Mixture" was tested in 19 cases. Six treatments failed to "cure" a single case. The numbers of ova per coverslip were usually reduced but for purposes of sterilization the mixture was useless.

No 3. Thymol is unreliable as a means of sterilization and is inferior to chenopodium. Of 12 cases treated and tested completely 4 only were "cured," one by 3 treatments, one by 4 treatments and two by 5 treatments. Methylene blue, *Embelia ribes*, *Vernonia anthelmintica*, Butea seeds, various bitters, camphor, clove oil, peppermint oil and copaiba were found useless. Turpentine given in 20 min. doses t.i.d. for ten days "cured" one out of seven cases.

R. T. L.

MEYER (E. C.). Distribution and Control of Hookworm Disease in India.—*Report to the International Health Board. The Rockefeller Foundation. 1918. [Lithographic copy.]*

This report is a compilation based upon a bibliography of 200 articles published by various authors either in periodical literature or issued under government authority. Part I deals with the distribution of hookworm disease in India. Hookworm is distributed over almost the whole of the Indian Empire but so far as present knowledge goes it seems to be most prevalent in the provinces of Bengal, Assam and Madras. Various estimates of the degree of infection have been made. DOPFER gives it as 75 per cent. for the native population; GREY as 60 per cent. to 80 per cent. of the general population; ROGERS as 80 per cent. and upwards of the healthy inhabitants; LANE as 80 per cent. of the rural population in the plains; POWEL as 75 to 90 per cent. of the labouring classes; and HEISER as 74 per cent. of all hospital admissions.

By summarising all the information found reported in the literature the following figures were obtained:—

Province.	Section of India	No pers'ns examined.	No. found infected.	Perc'nt-age of infection.	Population in 1911.
Andaman & Nicobar islands	S.E.	1812	1413	78.02	26,450
Madras Presidency . . .	S.E.	15223	11184	73.47	41,405,404
Assam	N.E.	6545	4552	69.55	6,713,635
Bengal	E.	12808	8010	62.54	45,483,077
Bihar and Orissa . . .	C.	1608	915	56.90	34,490,184
United Provinces . . .	N.E.	1080	416	38.51	47,182,044
Central Provinces and Berar	C.	2115	740	34.98	13,916,308
Burma	E.	2469	184	7.45	12,115,217
Bombay Presidency . .	W.	489	14	2.86	19,672,642
Punjab	N.W.	15	5	33.00	19,974,956
Nepal (Native State) . .	N.E.	11	7	63.63	5,000,000

Out of a total jail population of India of 2,900,343 from 1898 to 1914 there were 2,755 cases of hookworm admitted to hospital for hookworm disease and 195 resultant deaths.

The British Government found infection among English troops high. The details are given from the various authorities cited in regard to the infection in each of the above provinces in the second section of the first part of the Report. Infection of the mines has been noted by OLIVARES (1911) in the Madras Presidency and in the gold mines of Kolar in Mysore. GREGORSON thinks it probable that, as the workings of the Indian coal fields becomes deeper with the exhaustion of the upper seams, hookworm disease may occur in more virulent form.

Part II of the Report deals with the control of hookworm disease in India. No organised effort seems to have been made by the British Government to control or eradicate the disease in India. In several instances the records state that the disease is not serious enough to need measures for its prevention or eradication. More recently, however, according to NORRIS (1916), an effort is being made to measure its relative importance as a factor in the ill health of the people. There is no record of any attempt to control surface infection in the Andaman and Nicobar Islands, in the Punjab, Bombay Presidency, Nepal, Bihar and Orissa, United, N. West, and Central Provinces. In the Madras Presidency at Negapatam, an extensive investigation into the prevalence of infection was carried out but no treatment was given to those found infected. In Assam the immigrants are more heavily infected than the indigenous population. The bulk of the immigrant labour is employed in the tea industry. The coolies aggregate in dense communities in which no attempt has been made at night soil disposal. Throughout the province sanitary conditions are more conducive to the spread of hookworm than in most provinces of India. The soil of Assam is essentially muddy and only during a short dry season becomes absolutely dry on the surface. Mud which is probably teeming with infective larvae is being continually carried into the huts on the feet of the inhabitants.

In Assam owing to the scantiness of the indigenous population the resources of the country can only be developed by importing labour at immense expense, from parts of India where there is a surplus population. Thus the usual relationships of capital and labour are almost reversed, for the employer is vitally concerned in the preservation of the health of the immigrant and as a rule the planters are quite ready to spend money upon sanitary objects. Where they fall short it is from an insufficient appreciation of the absolutely definite relationship that exists between good health and good sanitation.

In Mysore the Chief Medical Officer in the Kolar Gold Fields issued a circular (1905) warning mining authorities to pay strict attention to the disinfection of underground workings and ladder ways with izar but there is great expense and difficulty owing to the tremendous extent of the working and length of ladder-ways that would have to be treated.

The Report concludes with a summary of the value and difficulties in the way of control, the preparations necessary for the introduction of a hookworm campaign and the suggestions that have been made from time to time as to the most effective lines upon which the Government of India could act.

BERCOVITZ (N) The Comparative Value of Thymol and Chenopodium in the Treatment of Uncinariasis.—*China Med J* 1919 Jan. Vol 33. No. 1. pp 31-37.

Amongst the pupils of the two mission schools in Kachek, Hainan, 89 1/4 per cent. were found infected with hookworm (126 out of 141). In order to make the conditions uniform in every respect in comparing thymol and chenopodium as an anthelmintic the diet of the pupil was restricted to rice and vegetables on the day preceding treatment. The evening before treatment each pupil received an ounce of magnesium sulphate and for several days previously tonic treatment, either Bland pills or iron and arsenic pills had been administered and were continued for a period of ten days or two weeks afterwards. The thymol was given in hard gelatin capsules, thirty grains each of thymol and sodium bicarbonate in two doses one hour apart being followed by an ounce of magnesium sulphate one hour after the last dose. The chenopodium in doses of 20 to 36 drops, according to patient's weight, was given in hot coffee or in simple syrup in two separate doses one hour apart and was followed by an ounce of magnesium sulphate one hour after the last dose. The results are tabulated.—

Total No. treated.	No. of patients.	Cured 1st treatment.	% cured	Cured 2nd treatment.	%cured(2nd treatment)
Oil of chenopodium.	68	49	72%	10	98.3%
Thymol ..	50	21	42%	11	72%

The author finds chenopodium safer and easier to administer than thymol. Moreover its value as an effective vermifuge for *Ascaris lumbricoides* makes it especially attractive in China.

R. T. L.

KNOWLTON (R. H.). Hookworm Infection among Troops. Treatment with Oil of Chenopodium.—*Jl. Amer. Med. Assoc.* 1919. Mch. 8. Vol. 72. No. 10. pp. 701-703.

The cases studied were American Troops chiefly from the Carolines and Florida. All were known to have stools containing hookworm eggs. The investigation was undertaken to check the efficacy of the treatment as used in the Hospital. Oil of chenopodium was given fresh, in soft gelatin capsules and in hard (soluble) capsules. The results indicated that in the capsule treatment there was a loss of efficiency due only partly to smaller actual dosage but chiefly to lack of solubility of the capsules. The soft gelatin capsules stated to contain 5 minims were distinctly less efficient than a similar dose placed in hard soluble capsules. The following interesting table is given to show the correlation between the haemoglobin, as taken by a Tallquist scale and the number of worms found.

Haemoglobin.

No. of Worms	60 to 69	70 to 79	80 to 89	90 to 100
1 to 25	—	4	9	2
26 to 50	—	4	4	—
51 to 100	—	1	5	3
101 to 200	—	4	8	—
201 to 350	—	1	5	1
351 to 500	—	1	2	—
501 to 1000	1	—	1	—
over 1000	2	1	—	—

R. T. L.

YOSHIDA (Sadao). On the Development of *Ascaris lumbricoides*.—*Jl. Parasit.* 1919. Mch. Vol. 5. No. 3. pp. 105-115. With 1 plate.

The minimum time for the development of fertilised *Ascaris* eggs is 15 days, even in summer the great majority of eggs require 30 days. Widely varying stages of development occur in the same culture. The optimum temperature is 28° to 34° C. Eggs short of maturity do not develop embryos in the alimentary canal of the host. The embryos hatch from ripe eggs within from 12 to 19 hours after they are swallowed by experimental animals. The liver is apparently undamaged by the migration of the larvae through it, whereas considerable haemorrhage results in the lungs. On reaching the intestine after their passage through the lungs the larvae are unable to develop in experimental animals such as the guinea-pig, as these are not normal hosts. Migration takes place in the cat, rabbit and monkey. The author swallowed a number of larvae taken from the lungs of an experimentally infected guinea-pig. Seventy-five days after the last feeding with such larvae numerous eggs appeared in the faeces. Data of the measurements of various parts of the body in larvae from the lungs are tabulated. Although the forms from the lungs are three or four times as large as those from the liver there are no remarkable differences in structure.

R. T. L.

RANSOM (B. H.) & FOSTER (W. D.) Recent Discoveries Concerning the Life History of *Ascaris lumbricoides*.—*Jl. Parasit.* 1919. Mch. Vol. 5. No. 3. pp. 93-99.

In guinea-pigs and rabbits the larvae of *Ascaris lumbricoides* behave as they do in rats and mice in respect of their development, migration and elimination. They also similarly cause a more or less severe pneumonia. In experiments upon a goat and a lamb the authors found, ten days after administration of eggs, numerous *Ascaris* larvae 1 to 2 mm. in length in the lungs, trachea, oesophagus and stomach and 27 days after administration thousands of young ascarids about 10 mm. in length in the small intestine. The authors believe that these results confirm STEWART'S observations but discredit his hypothesis that rats and mice are essential intermediate hosts. They conclude that the *Ascaris ovis* found occasionally in sheep is an accidental infection with the pig ascaris. Hatching of *Ascaris* eggs takes place in the small intestine and results from the active penetration

of the shell by the embryo, not from any apparent digestion. It is recalled that MARTIN (1913) found that eggs of *Ascaris vitulorum* hatched when introduced beneath the skin of a guinea-pig. The authors find that these larvae appear later in the lungs.

R. T. L.

SCHWARTZ (B.). A Blood-destroying Substance in *Ascaris lumbricoides*
—*Jl. of Agricultural Res.* 1919. Mch. Vol. 16. pp. 254-257

The body fluid of *Ascaris lumbricoides* taken from worms shortly after their removal from the host is not haemolytic to the washed erythrocytes of swine, cattle, sheep, rabbits, guinea-pigs and rats. If the worms are kept alive in salt solution for a few days they acquire in from six to eight days a decidedly destructive capacity towards the red blood corpuscles of swine and sheep. The haemotoxic substances apparently partake of the nature of endotoxins. The haemolytic property is thermostabile and resists boiling. Serum has an inhibitory effect on the action of the body-fluid and of extracts of the worm, and unless the reaction *in vivo* differs from that occurring *in vitro* this would appear to negative the view that anaemia in animals harbouring ascarids is due to the toxic secretions of the worms. The author's observations tend to support the view that *Ascaris* causes anaemia by directly absorbing the blood of its host. The body fluid of *Ascaris* contains oxyhaemoglobin which is liberated from the blood corpuscles by the haemolytic substance so abundant in the intestine of the worm. The significance of the occurrence of the oxyhaemoglobin in the body-fluid is not yet clearly understood.

R. T. L.

JACKSON (F. H.). Intraperitoneal Abscess containing Roundworms.—
Jl. Amer. Med. Assoc. 1919 Feb. 8. Vol. 72. No. 6. pp. 412-413.

A girl, aged 16, was admitted to the Madigan Memorial Hospital on April 27, 1917. On Jan. 20th of the previous year she had been operated on for intraperitoneal abscess caused by a ruptured appendix and was discharged as well. She was now admitted for relief of a very severe pain in the entire lower abdomen. The temperature was 101° and the pulse 120. There was intense nausea and profuse vomiting. The severe clinical condition had persisted for about 36 hours but the patient had not felt well for several days previously. A large abscess was found on the right of the abdomen at the level of the pelvic brim. It contained about a quart of intensely foetid pus in which were two live lumbricoid worms. The wall of the abscess had a tubercular appearance. No opening into the intestine could be found. The cavity was drained through the large abdominal incision. After a critical seventy-two hours the patient made rapid progress and eventually left well.

R. T. L.

TODD (Charles) & WHITE (R. G.). An Endemic Centre of Filarial Infection in the Neighbourhood of Cairo.—*Egypt. Report & Notes Public Health Laboratories, Cairo.* 1917. No. 1. pp. 3-7. With 1 map.

The village of Abu Ruweish situated some eight kilometres north of the Pyramids of Giza near Cairo is an endemic centre of filariasis. Twenty-five cases of elephantiasis were seen in a temporary dispensary working in the area for three weeks. In one case there was a definite

history that the patient had had elephantiasis for 62 years. The night blood of 438 persons was examined and in 125 cases filaria embryos were found. In the villages of Abu Ruweish and Kafr Ghatâti probably not less than half of the whole population is infected. Proceeding southwards the percentage of infected individual rapidly falls. The authors point out that it is remarkable that the infection has remained localised seeing that there is an abundance of mosquitoes known to be capable of carrying the disease in other parts of Egypt. A desert road leading from the Oasis of Siwa enters the cultivated land near Abu Ruweish but it would appear doubtful if the infection came from there as no case with microfilariae was found by an examination of the night blood of 28 Siwans.

The blood of 30 inhabitants of the Oasis of Bahariya was likewise negative. Only two out of 38 patients and attendants in the Cairo Fever Hospital had nocturnal embryos in their blood and these men had occupied neighbouring houses in the village of Abnub (Asyût mudriya). A table is given showing the age distribution of population infected with microfilariae. Between 0-19 years the incidence is 23.15 per cent.; between 20-40 years it is 31.7 per cent., from 41-60 it is 28 per cent., and over sixty 1 out of 8 cases was positive.

R. T. L.

DUMAS (Julien) & PETIT (Auguste). *Lymphadénome de la vaginale et Némathelminthe chez un Homme n'ayant pas quitté la France.*—*C.R. Soc. Biol.* 1919 May 17. Vol. 82. No 14 pp. 512-514. With 1 fig.

The case recorded in this paper is that of a man of sixty years who lived in Paris and had been employed by the Northern Railway Co. For the last four years he had had a swelling of the scrotum. Puncture of the left tunica vaginalis resulted in the discharge of 1,250 cc. of chocolate-coloured fluid. The parietal tunica, which was hard, fibrous and greatly thickened, was dissected away. Microscopical examination of sections of this tissue revealed the presence of a parasite. M. RAILLIET has diagnosed this as a nematode, very probably a filaria, and perhaps a male *Filaria bancrofti*. The worm in the section had a diameter of 125μ and the testicle was in full functional activity.

R. T. L.

PANAYOTATOU (Angélique). *A l'occasion de deux cas de filariose.*—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1919. Jan. 2. 3 Ser. Vol. 34. No. 36-37. pp. 1230-1234.

Following a brief introduction describing the chief features of filarial infection the clinical histories are given of two cases of filariasis observed by the author.

Case I. was a young girl, 14 years old, belonging to Asia Minor but who had resided in Alexandria during the previous three years. A sudden and painful tumefaction of the left labium necessitated medical advice. There were varicose dilatations of the lymphatic vessels. The tumour was extirpated by repeated cauterisations with silver nitrate. The blood was examined for filaria embryos. These were found only at night.

Case II, a woman, 52 years old, presented a tumour in the left inguinal region. This has increased during a period of 4 years from the size of a nut to that of a fist. It is soft, lipoid and slightly lobulated.

At times the swelling increases in size with sudden attacks of pain. On paracentesis a milky fluid was obtained and in it were found filaria embryos. The paroxysmal attacks of pain are attributable to the great dilatation of the inguinal lymphatics for they coincide with the enlargement of the swelling.

R. T. L.

FORBES (J. G.). Filarial Infection in Macedonia. Report of Two Cases of *Filaria conjunctivae* (Addario) in Man, with the First Recorded Discovery of the Male Worm.—*Lancet*. 1919. Apl. 19. pp. 654-656. With 8 figs.

This paper would appear to be the same as that published in the *Transactions of The Society of Tropical Medicine* [see this *Bulletin*, Vol. 13, p. 216] with the addition of eight figures illustrating the tumour and the adult *Filaria conjunctivae* found.

R. T. L.

THURSTON (A. Temple). Note on a Case of a Living *Filaria* removed from the Eyelid.—*Med Jl. S Africa*. 1918. Nov. Vol. 14. No. 4. p. 299.

A worm diagnosed as *Filaria loa* was removed from under the skin of the lid of the right eye in a patient who had come from the Belgian Congo not far from the Stanley Falls. The worm is "very like an ordinary threadworm of the rectum, about an eighth of an inch longer." The patient states that these worms are common among white men in his part of the Congo.

R. T. L.

ROSE (F. G.). A Short Note on the Results of Vaccine Treatment in Filarial Lymphangitis in British Guiana.—*Jl Trop Med & Hyg*. 1919. May 1. Vol. 22. No 9. p. 81.

Filarial lymphangitis, lymphadenitis, lymphocoele, chyluria and other conditions associated with the presence of filarial infection are amongst the commonest conditions which confront the medical practitioner in British Guiana in spite of mosquito by-laws. The author, having confirmed Wise's discovery (1915) of the presence of a streptococcus in some of these cases has arrived at an effective method of giving curative inoculations. A series of three was found most effective, viz., 100 million dead cocci, followed at intervals of two weeks by two further doses each of 200 millions. The reactions are almost invariably mild and the doses may be doubled in long standing cases. Sixty persons have been inoculated by this method. Nineteen cases were of longer than one year's duration; 9 of these have had no recurrences; in the others the attacks have grown milder. Of 41 recent cases 30 were inoculated a year or more ago and none has had a single attack since. Three of the remaining 11 cannot be traced; 2 remained free for over a year, while the remaining six were done six months ago and have so far had no recurrence. Where oedema has lasted for some considerable time the inoculations gradually cause its disappearance.

R. T. L.

DESCHAMPS. Sur un cas de chylurie filarienne guérie par le novarsénobenzol.—*Bull. Acad. Méd.* 1919. May 20 Vol. 81. No 20. pp. 655-657.

A Senegalese with chyluria of filarial origin was treated with five intravenous injections of novarsénobenzol (30, 45, 60, 75, 90 cgm) at 8 day intervals. At the conclusion of this course of treatment the urine had become limpid and absolutely normal in appearance. The filaria embryos which formerly had been found living in the urine had now disappeared. The patient suffered also from urinary bilharziasis and the treatment appeared to have no effect upon the bilharzial lesions. The reporter, Dr Bazy, draws attention to the value of 3 gms of sodium citrate in resolving the coagulations of the urine in the bladder, in this case.

R. T. L.

CALDERÓN (Victor Manuel) *Enfermedad nueva en Guatemala.* [A New Disease in Guatemala]—*Juventud Médica*, Guatemala. 1917 Aug. Vol 17 No 8. (Year 18. No 177.) pp 97-115. With 10 figs.

The article is a report by Dr. Calderón of a paper read by Dr RODOLFO ROBLES before the Society *Juventud Médica* in March 1917. Dr. Robles relates that about 2 years before the date of his paper a female patient consulted him stating that she suffered from a periodical "erysipelas" of the face. The attacks were accompanied by fever and by burning and itching of the affected parts, and the patient further stated that she had lost her sight. Careful examination made it plain to the author that he had to do, not with a streptococcal erysipelas, but with a disease hitherto unknown to him. A little later the author was consulted by a boy coming from a village at a considerable distance from that from which came the former patient. The symptoms were however identical. The ocular symptoms consisted of conjunctivitis, iritis and keratitis; there was constant periorbital pain and headache with periodic exacerbations, marked diminution of vision and intense photophobia. The eyelids, forehead and upper lip were oedematous, the cheeks swollen, the skin dry and shining. Both cheeks showed a greenish discoloration such as one sees in an ecchymosis several days old. On palpation the oedema was found to be hard, not pitting on pressure. The ears were much swollen, with the skin red and shining like that of the cheeks. This boy had a tumour on his forehead about the size of a cherry, which, his mother stated, he had had for some years. On removing and incising the tumour it was found to contain a slender worm with the characters of a filaria. It was plain that the inflammatory symptoms described were due to the presence of the parasite. The next day the boy's appearance was entirely changed; the oedema and conjunctivitis had disappeared, the vision had cleared and the periorbital headache ceased. The filaria was identified as *Onchocerca volvulus*.

Further investigation shewed that the inflammatory syndrome above described and known locally as *Erysipela de la Costa* (Erysipelas of the Coast) was always associated with the presence of external tumours such as that presented by the boy whose case has been given, and that

these tumours were cysts containing filariae. The disease is met with in a broad strip of country stretching from the slopes of the volcano "Fuego" to those of "Atitlan," at a height varying from two to four thousand feet above sea level. In some districts the line of demarcation is so sharp that in two plantations (fincas), one at 2,000 feet and the other at 2,200, cases will be found at the second and none at the first. One plantation "El Baul" has two sets of dwellings for the workers, one at 2,300, the other at 2,000 feet. Both belonging to the same plantation, there is constant communication between the two; nevertheless, in the upper, all the inhabitants suffer from the disease, while in the lower none are attacked who have never left it. Those of its inhabitants, however, who work during the day at altitudes between 2,300 and 2,900 feet are liable to be attacked though they have never slept at the upper settlement or remained there after sundown. Many of these have married women who have never visited the upper settlement and who though living with an infected husband, have never contracted the disease. Similarly men living and working at the lower settlement but married to infected women from the upper remain uninfected. The two settlements have the same water supply and the labour conditions and habits of life are identical.

Careful investigation has shewn that only two species of fly, both of the genus *Simulium*, *S. emboni* and *S. dunelli*, are found in the infested altitude zone, viz., between 2,000 and 4,000 feet, and further, that where these insects are most numerous there, also, are most cases of the disease. The symptoms are different in the acute and chronic stages of the disease. In the acute stage, if the cysts are on the head, which is the more usual case, the whole face is swollen, the skin red, tense, shining and painful, the pain resembling exactly that of facial erysipelas due to the streptococcus. The temperature varies from 102° to 104° F. In children there is great prostration and often convulsions and delirium. the conjunctivae are inflamed, the ears, eyelids and lips swollen. The patient complains of sharp pain all over the affected skin and of subjective sensations as if insects were crawling over the face. Scratching causes burning and severe pain. There is periorbital pain with exacerbations of terrible severity. The cornea presents a condition of keratitis punctata and iritis is a further complication in some cases. No abnormalities in the fundus have been found. Neuralgias of the whole trigeminal area are not uncommon and there is generally some tinnitus with intermittent or continuous deafness. The tympanum is normal. In the chronic stage the cheeks exhibit a hard oedema; the skin is shining with a livid greenish coloration which is absolutely typical; the ears are doubled in size, with furrowed and scaly integument. If the limbs are affected there is a uniform hard oedema resembling that of elephantiasis Arabum, but the typical greenish coloration puts the diagnosis instantly beyond doubt. As regards treatment Dr. ROULES states that injections of biniodide of mercury into the cyst kill the parasite but cause an aggravation of the symptoms which lasts for some days. The best treatment is the complete removal of the cysts with their fibrous prolongations. The author operates under local anaesthesia using a 1-500 solution of cocain with adrenalin.

F. S. A.

JEANSELME (E). Note sur un cas de ver de Guinée radicalement guéri par le novarsénobenzol en injections intraveineuses.—*Bull. Acad. Méd.* 1919. Feb. 4. Year 83. 3 Ser. Vol. 81. No. 5. pp 156-158.

A young Senegalese soldier who had three guineaworms received four intravenous injections of novarsénobenzol at intervals of eight hours. The first injection was one of 0.15 centigrammes, the second and third of 0.3, and the fourth of 0.45 cgm. Four days after the third injection a small superficial tumour, fluctuating and painful, formed on the outer aspect of the middle third of the left leg. After the fourth injection 3 fragments of a guineaworm were evacuated with pus from the left popliteal space. Some days later the patient extracted a dead worm from a sinus near the left external malleolus. This worm had hitherto resisted extraction and the patient had "rolled out" about 10 cms. That the arsenic had had a direct action on the parasites was not proved as no traces could be discovered by an analysis of the dead worms.

R. T. L.

BRÁS DE SÁ. Note sur l'existence du *Cyclops coronatus* à Diu. (Comprennant quelques indications pour l'extinction de la dracunculose dans cette province.)—*Bol. Ger. Med. e Farmácia Nova-Goa* 1919. Jan. Vol. 5 No 1. pp 1-10.

Dracontiasis has been endemic for many years in Diu. Soldiers returning to Goa from service in the province have been infested with guineaworm. In a monograph "Biche de Ormuz" published by Capt. J. J. FRAGOSO in 1897 it is affirmed that *Cyclops* does not occur in the province. Other and earlier local writers attribute the infection to soiled water or vegetables. The object of the present paper is to record the occurrence of *Cyclops* and to outline the prophylactic measures in use elsewhere for the prevention of the disease.

R. T. L.

HOWARD (H. H.) The Control of Hookworm Disease by the Intensive Method.—*The Rockefeller Foundation. Publication No. 8.* 1919. New York City: International Health Board. pp. 189. 9 illustrations.

The procedure known as the Intensive Method was described in Publication No 1 issued in 1914. The working plan has since undergone some modifications and developments. The present account gives the general procedure to be followed in conducting any demonstration against hookworm disease by the intensive method, omitting the specific details of a campaign in any one country.

The control of *Ankylostome* infection is a task of enormous magnitude as it occurs in practically all countries which lie in the tropical and sub-tropical zones from 36° N. to 30° S. Within this area more than half of the population of the globe resides.

Theoretically control of the disease should prove easy, for the complete life-cycle of the parasite is now known and two drugs at least of potent anthelmintic value are of easy administration. Lack of complete co-operation on the part of the people who are to be most benefited is the chief practical difficulty experienced. It is emphasized

that the International Health Board does not itself undertake to relieve and control hookworm disease in any country on its own account. It is willing to demonstrate by lending its trained men and efficient organisation that the end in view can be attained at a non-prohibitive cost, but the State or country concerned must assume the burden and responsibility of establishing permanent agencies, if the work is to be of value in the long run. The preventive side of the problem—that of securing the installation or improvement of latrines and their continued maintenance and use—is left entirely in the hands of the local governments.

The size of the area selected for operations on the intensive plan depends upon the staff available, but with an unit consisting of one medical director in charge, two clerks, four microscopists, twelve nurses, and one or two low-salaried helpers or caretakers, the area selected should include about 2,400 infected persons, giving thus 150 to 200 cases to each nurse to treat. In the West Indies, with an average infection of 65 per cent., the average area adopted has a population of about 3,600 persons. To cover this area a unit requires approximately three months. Each nurse is given a district and is responsible for every detail of the work therein. When the period of treatment is approaching a conclusion, and the total number of uncured cases has been reduced to about 200, these several districts are placed under the charge of a single nurse who continues to administer treatment until all have been cured. The other nurses meanwhile commence upon a new and usually adjacent area. Although the intensive method is an attempt to approximate the complete relief and control of hookworm disease within a given area, the whole work is essentially educative by practical demonstration. By lectures, the distribution of literature, the co-operation of the local press, microscopical demonstrations at the laboratory and in the homes of the people, as well as by the personal influence of the nurses who frequently call at the homes to collect specimens and to give treatment. A systematic publicity and educational campaign is maintained, and favourable opportunities occur to teach valuable lessons on the prevention of disease in general.

There is a definite relation between the different elements of the working force "unit" which as stated above has been found the most efficient. Of the 4 microscopists one verifies and records the work of the others and instructs them in their duties. Four nurses actively engaged in their field routine supply sufficient specimens to occupy the time of one microscopist. It is better to increase the number of units than to materially alter the proportions in a unit. The establishment of branch offices has proved a failure owing to the absence of constant supervision by the medical director.

The director, to secure efficient work, is given legal power to terminate the services of any undesirable member, and on this account the "seconding" of government employees as subordinates in the force is open to objection. The director is at all times accessible to the people and visits all persons found infected, to ascertain whether or no treatment can be safely administered and to prescribe the dosage. The duties of the clerical force, the chief microscopist and his assistants, the nurses and caretakers, and their selection and training are fully defined in successive paragraphs of the Report.

The salaries paid are above those usually obtained in any other line of work and enabled the director always to secure the right type. No subordinate employee is paid any allowance for travel, sustenance or quarters or for any other purpose.

In the chapter on census-taking it is stated that a decided economy of time was effected by allowing the nurse to deliver to each individual a specimen container marked with the name, age, house-number, and to have this called for the following day. A survey of latrine conditions at each house is made at the taking of the census and included in the return. The census is usually taken in the afternoon and the return visit for the containers made in the mornings. The nurse prepares a large map showing the location of each house in his district.

A chapter is devoted to the microscopical laboratory and the need of a standard technique is clearly illustrated. The technique advised is detailed. The chief microscopist receives, counts and checks the containers brought by the nurse and initials the census list. From each specimen in turn the chief microscopist prepares three smears on 2 by 3 inch slides, using water as a diuent and a toothpick with which to spread the smear evenly. This he discards when the third smear is made. No cover glasses are used. One smear is then given to each of the three assistants. While these are making the microscopical examination the chief microscopist prepares the set from the next stool. If a positive result is obtained it is verified and recorded by the chief microscopist. If all three smears are found negative to hookworm infection the stool is set aside for the centrifuge later. Only positive results are eliminated at this stage and these are heavy infections. A modification which permits of more rapid and almost equally accurate work is to prepare one smear from each of three specimens, the chief microscopist verifying and recording the findings of each assistant at once. The average findings on successive slides examined with the standard technique is tabulated:—

Results obtained on Each Smear before and after Centrifuging, in Examining Specimens from 1,434 Persons in Trinidad.

	Examined	Positive.	Per cent. Positive.	Negative.
Before centrifuging.				
First smear ..	1434	609	42.4	825
Second smear ..	825	132	9.2	693
After centrifuging.				
First smear ..	693	109	7.6	584
Second sm ar. ..	534	45	3.2	539
Third smear ..	539	0	0	539
Total. ..		895	62.4	

(Note: To diagnose the specimens submitted by these 1,434 persons, 4,614 separate microscopic examinations were required.)

The method of centrifuging advocated is given in detail. Three smears are prepared from the deposit of each specimen and examined in the way described above. After two treatments it is a waste of

time to examine more than one smear before centrifuging. So few cases are cured with one treatment that no re-examination is made until a sufficient interval has elapsed after the second treatment. A laboratory unit with 4 microscopists should handle from 200 to 300 specimens daily.

In the chapter on treatment the author states that thymol remains the drug of his choice. The "daily dose" of ten grains for an adult (and proportionally for a child) advocated by Dr. J. E. A. FERGUSON was found to reduce infection-index from 69 to 31 per cent, the amount of thymol necessary for a cure in individual cases ranging from 250 to 2,000 grains. Many difficulties arise owing to the prolongation of treatment necessary, and the per capita cost is too high for the method to be used extensively.

The intensive or weekly-dose method is advocated. The patient is given a dose of thymol on one day of each week until cured. The dose is a maximum of sixty grains for an adult, preceded and followed by active saline purgative, the patient being required to abstain from food for at least eighteen hours during the treatment.

Persons medically unfit for treatment include those suffering from acute diseases such as malaria (febrile stage), fevers of any type, diarrhoea, dysentery, gastritis, etc., those having chronic dysentery, gastritis, organic cardiac or renal disease, pulmonary tuberculosis beyond the incipient stage, or general anasarca, those extremely weak or feeble from old age or from other cause, pregnant women or those with serious haemorrhagic diseases of the uterus. Such cases should only be treated, if at all, under hospital conditions. Several weekly doses of thymol are usually necessary for a cure. If properly prepared 50 per cent. of the patients should be cured with two treatments. Only a small percentage require more than 3 treatments. The author supports Dr WASHBURN's conclusions that thymol when combined with an equal quantity of milk-sugar and thoroughly triturated is much more effective than when given alone or in the granular state. The presence in the intestinal canal of ether oils, fats, or alcohol will often give rise to toxic symptoms after thymol administration. These follow also if the drug is allowed to remain in the alimentary canal indefinitely. The minor symptoms of thymol poisoning are (1) muscular weakness and lassitude, (2) vertigo and giddiness, (3) gastric and intestinal irritation, (4) nausea. The serious symptoms are vertigo accompanied by headache, tinnitus and disturbance of vision. The pulse at first slowed becomes rapid, thready and weak. The respiration is slowed and may assume Cheyne-Stokes character. The lips and fingers are blue, the face pale, anxious and clammy. There is a fall of temperature. Delirium may precede recovery or, the cyanosis increasing, the respiration and circulation are further depressed and complete coma terminates in death. The treatment of milder form of toxic symptoms is bed, strong coffee, enema of warm water and, if necessary, a full cathartic dose of salines. Where collapse has already occurred stimulants such as morphia $\frac{1}{2}$ gr. with atropine $\frac{1}{100}$ gr., strychnine nitrate $\frac{1}{80}$ gr., nitroglycerine $\frac{1}{100}$ gr., or digitalin $\frac{1}{100}$ gr. (adult dose) may be used. Every effort to empty the bowel thoroughly should be made to prevent further absorption of thymol. Recovery is very rapid.

Cost Per Person Examined, Treated, or Cured in Intensive Work in the West Indian Colonies during Period 1914-1917 Inclusive

Colony.	Total expenditure divided by number of persons examined.					Total expenditure divided by number of persons treated.					Total expenditure divided by number of persons cured.
	Average for all years.	1914.	1915.	1916	1917.	Average for all years.	1914.	1915.	1916.	1917.	
All Co'onies ..	\$1.16	\$1.02	\$.69	\$1.47	\$1.22	\$2.13	\$1.93	\$1.61	\$2.25	\$2.13	\$2.65
Antigua ..	.85		.90	1.42	.47	6.0		4.02	5.50	9.33	6.31
British Guiana ..	1.02	1.02	.45	2.30	1.56	1.90	1.93	1.27	2.24	2.36	2.41
Dutch Guiana ..	1.87	..	1.40	1.35	2.62	2.21	..	1.80	1.71	2.82	2.61
Grenada ..	1.97	..	..	3.89	1.19	3.28	..	..	5.05	2.25	4.32
St Lucia ..	1.04	..	.76	1.05	1.49	2.07	..	1.47	2.86	2.32	2.81
St. Vincent ..	1.04	..	.91	1.14	1.04	1.97	..	2.75	1.90	1.75	2.21
Trinidad ..	1.13	..	1.11	1.77	.76	1.73	..	1.76	2.67	1.16	2.30

The various methods of exhibiting chenopodium oil are described. A fortnight should elapse before the drug is administered a second time. The author states however that a considerable number of cases of poisoning have recently been brought to his notice, only a few of which have appeared in medical literature. He is of opinion that it is a powerful poison, often uncertain in action with our present dosage and methods of administration and preparation. The symptoms and treatment of poisoning are detailed.

In dealing with sanitary measures for prevention (Chapter IX) the International Health Board does not undertake to advise as to the definite type of latrine to be installed. The pit latrine has advantages over the pail latrine in expense, simplicity and automatic operation. It involves however whatever dangers the accumulation of excreta underground imply from contamination of water supplies by seepage etc., the provision of a safe and practical method of sewage disposal for the rural home is still an unsolved problem.

The "per capita" cost of the intensive method for the year or for the completed work is expressed in a table showing the per capita cost (of examinations, treatment or cure) of the campaigns in the West Indies during 1914-1917. The tendency has been downward in spite of great advances in the cost of medical supplies, apparatus, etc., and has probably followed improvements in methods, increased efficiency of staff and closer co-operation of the public.

An appendix gives copies of the official forms used in the campaigns. The wider results of a hookworm campaign would appear to be best attained by the intensive method. The people receive an impressive object lesson in sanitation and learn the basic facts underlying the spread of diseases due to soil pollution.

[Much of the above is literal transcription in view of the authoritative nature of the publication.]

R. T. L.

HOOKWORM CAMPAIGNS (1917).*

Cayman Islands (1917) †

The three islands Grand Cayman, Cayman Brac and Little Cayman form a dependency of Jamaica. The Grand Cayman has a population of 3,950 persons and lies 178 miles north west of Negril Point, Jamaica. The two lesser islands are 110 miles away. The present estimated population is 200 persons on Little Cayman and 1,100 on Cayman Brac, giving a total of 5,250 persons for the three islands. 1,340 of these were examined at an inspection, made during 1917 by Dr. J. L. HYDRICK. 228 or 17.01 per cent. were positive to *Ankylostomes*. 20 per cent. of the males and 17 per cent. of the females were infected. 66 per cent. of the specimens examined contained eggs of *Ascaris lumbricoides* and 79 per cent. those of *Trichuris trichiura*. 10 per cent. showed embryos of *Strongyloides intestinalis*. In one case the ova of *Oxyuris vermicularis* were seen. 8 per cent. contained no ova or larvae. The infection with *Ankylostomes* varied in different sections

* For 1916 see this *Bulletin*, Vol. 11, pp. 100-111.

† Report (No 7297) on Hookworm Survey of the Cayman Islands by Dr. J. L. HYDRICK.

of Grand Cayman from 3 to 55 per cent, and in Cayman Brac from 24 to 14 per cent. It is noticeable that infection is heaviest in the towns which are nearest the mangrove swamps. No infected person was found on Little Cayman. There is little likelihood of the infection spreading widely in the islands owing to the lack of shade and moisture.

The Public Health Laws are excellent and are well enforced.

Tobago (1917)

An infection survey showed that of 2,414 persons examined (out of a total population of about 22,142) 63 per cent were infected. A fairly uniform degree of infection seemed to be present throughout the different parishes. The natives travel much from one part of the island to another and there is little variation in topography, cultivation or soil formation.

*Papua (1917) **

A preliminary survey under the auspices of the International Health Board and the Government of Australia was carried out by Dr J H WAIRE. The work was confined to the villages and plantations of the Central Division. 538 plantation labourers showed ankylostome infection in 65 per cent., while in 158 village natives only 8 per cent were infected. 150 miscellaneous individuals comprising hospital patients and travellers who had in the past either visited or worked on plantations gave 65 per cent infected. The village natives were from the coastal area of the Division and had never worked on a plantation. The houses in the village of this area are grouped on the sand beach and are built high over the tidal water on piles. Connected with small groups of dwellings by a crude bridge is a small latrine house set also on piles far out beyond the low-tide line. Inland villages have not been inspected. The latrine provisions on the Papuan plantations are inadequate and little used; consequently the surface soil is constantly polluted. Of the recruits in the Bomana, Katea, Kanosia and Galley Reach estates those who had served under 2½ months showed 13 per cent infected. After nine months' service there were 47 per cent infected and of those who had served fifteen months 73 per cent. were infected. These highly infected natives return to their villages at the close of their contract and thus aid greatly in heightening the infection-index of these villages.

Nicaragua (1917).

During 1917 the National Congress passed a law empowering local authorities to compel the remedying of deficiencies in old latrines, to construct new ones, and to conduct monthly a house to house inspection for the purpose of inquiring into sanitary conditions.

The work carried out followed the dispensary plan.

2. Examined	..	..	..	..	33,781
3 Found infected	..	..	..	..	18,422
4. Given first treatment	.	..	..	..	16,950
5. Cured	..	..	..	..	1,280
Percentage of treated cured	..	..	..	..	7.6%

* Preliminary Report on Ankylostomiasis in Papua. *Med. Jl. of Australia*, 1917, Sept. 15.

*Fiji (1917).**

The campaign during 1917 was conducted by Dr. G PAUL and comprised the area of Navua. The area is one of about fifty square miles and lies near the mouth of the Navua river, on the southern coast of the island of Vitilevu, twenty miles westward of Suva. The whole area is flat and low and much is at or below high tidal level. Heavy rains are frequent. The population is chiefly composed of settlements of "free" Indians. There is an occasional Fijian town. The campaign was conducted on the intensive plan and lasted from 1st March to 31st October. It is noted that the Indian population is more heavily infected than the native Fijians.

Sanitation Outside the properties of the few Europeans no means for the proper disposal of human excreta are existent. Of 993 houses inspected, 265 were provided with some means for night-soil disposal but of these 61 may be said to be serviceable though unsatisfactory.

In the Native Fijians' towns there are generally two communal privies, one for each sex. These privies usually overhang a stream. The Legislature have now made it imperative for each householder to construct and maintain a proper place for disposal of human excreta and a special sanitary sub-inspector has been appointed for the Navua area.

The results have so far been very good and the people have shown themselves ready to comply with these requirements.

1. Census (of Navua area)	.. ..	3,505
2. Examined	.. ..	3,434
3. Found infected	.. ..	3,088
4. Given first treatment	.. ..	3,010
5. Cured	.. ..	2,794
Percentage of infected cured	.. ..	90.5%
Percentage of treated cured	.. ..	92.8%
6. Removed from area (or dead)	.. ..	98
7. Remaining in area uncured (6.4%)	.. ..	196
(a) not located	.. ..	26
(b) refused	.. .. (none)	—
(c) medical reasons..	.. ..	22
(d) under treatment	.. ..	148

Incidentally examination was made for other parasites. Of the persons examined 29.2 per cent. were found infected with *Ascaris*, 14.5 per cent. with *Trichocephalus*. The ascarids were mostly prevalent amongst the East Indians while *Trichocephalus* occurred chiefly in the native Fijians.

Antigua (1917).

By the end of 1916, intensive operations against hookworm had been completed on three areas known as the York Valley district, the Belvidere district and All Saints district. Work in the rest of the

* *Ankylostomiasis*. Council Paper No. 97, 1917. Fiji Legislative Council.

Report (No. 7348) to the International Health Board by Dr. PAUL from March to December 1917.

International Health Board. Fourth Annual Report (1917).

island, including the Windward and Popeshead districts and the City of St. Johns, was completed by the end of the second quarter of 1917.

1. Census	15,140
2 Examined	11,122
3. Found infected	690
4 Given first treatment	580
5 Cured	535
Percentage of infected cured	77 5%
Percentage of treated cured	92 2%
6 Removed from area (or dead) (7 2%)	50
7 Remaining in area uncured (15 2%)	105
not located	15
refused	30
medical reasons	60
under treatment	—

In his report for a period ending June 1917, Dr. EUSWALD remarks that: "It is to be regretted that the phase for the prevention of soil pollution has not kept pace with that for the examination and treatment of the people. The native rural population is still almost entirely without latrine accommodation. Of 2,103 homes inspected in the Windward and Popeshead districts during 1917 only 67 were found to be provided with latrines."

*Trinidad (1917) **

During the year 1917 operations begun in 1916 in the adjoining areas of Arima and D'Abadie were completed. The St Joseph area situated about seven miles from Port-of-Spain was begun and completed and a campaign was also successfully concluded in the Tacarigua orphanage. In all the work the intensive plan of campaign was strictly adhered to. The treatment was administered in the homes of the people. The chief drug used was thymol. This was mixed with equal parts of sodium bicarbonate and was finely powdered. The mixture was administered in gelatin capsules.

Sanitary Improvement. In Arima and St. Joseph the sanitary conditions are better than those of the average tropical town. There are excellent water supplies and drainage and latrines are fairly well supplied. In the smaller villages of the areas however the conditions are less satisfactory. A series of inspections show that a certain number of pits have been provided during the year where none existed before.

"One great obstacle to the general use of latrines in Trinidad is the teaching of the Hindu religion. The disposal of human excrement is made nearly a religious rite. Definite rules are laid down for the procedure of the orthodox Brahman and among these it is specified that excrement is to be deposited on the surface of the ground in an open place and that two persons should not frequent the same spot."

Much tact is required therefore to overcome these prejudices but the East Indians who have been persuaded to construct latrines

* Trinidad Ankylostomiasis Commission. Report on operations during 1917. Council Paper No. 1 of 1918.

International Health Board. Fourth Annual Report (1917).

Report (No. 7358) to the International Health Board 1914-1917.

and having formed the habit of using them have been usually much pleased with the experiment.

Owing to the high level of the ground-water in the villages of the flat land where rice cultivation is becoming increasingly prevalent pits are rendered either useless or very repulsive. It is pointed out that the enforcement of sanitary improvement is not a function of the Trinidad Ankylostomiasis Commission.

1	Census (of complete areas)	14,024
2	Examined	13,561
3.	Found infected	(69.6%) 9,441
4.	Given First treatment	(90.8%) 8,573
5.	Cured	6,586
	Percentage of infected cured	69.76%
	Percentage of treated cured	76.8%
6	Removed from area (or dead)	(6.8%) 646
7	Remaining in area uncured	(23.4%) 2,209
	(a) not located	(7%) 64
	(b) refused	(12.3%) 1,164
	(c) medical reasons	(5.2%) 487
	(d) under treatment	(5.2%) 494

*St. Lucia (1917).**

During 1917 the campaign radiated from the Union-Girard Valley through the other valleys and over the ridges which lie between Castries and the Windward coast of the island. The population is scattered and sparse. The peasantry is entirely coloured. There are no villages. In addition to this intensive campaign a good deal of subsidiary outpatient work was carried on at the central office in Castries. A special sloop was purchased in 1917 to supplement the sewage barge in use by the people of Castries and the vicinity. The additional refuse depot greatly reduced the amount of soil pollution in and around northern Castries.

1	Census (area completed during 1917)	4,617
2	Examined	4,601
3	Found infected	3,060
4	Given First treatment	2,962
5	Cured	2,633
	Percentage of infected cured	86.7%
	Percentage of treated cured	89.6%
6.	Removed from area (or dead)	(3.5%) 108
7.	Remaining in area uncured	(9.8%) 299
	(a) refused	86
	(b) medical reasons	12
	(c) under treatment	161
	(d) unclassified	40

St. Vincent (1917).†

During the year the work was extended north along the eastern side of the central mountain range to include the four areas, Biabou,

* Report (No. 7395) to the International Health Board, January 1915 to December 1917.

† Report (No. 7389) to the International Health Board from May 1915 to December 1917.

New Grounds, Colonarie, and Georgetown, comprising about 35 square miles and having a coast of 12 miles in length. In addition to this campaign carried out under the intensive method the strip of land extending from the Dry river to the northern point of the island was dealt with by the dispensary method. The area contained only about 882 inhabitants in scattered and small villages as this region was devastated by volcanic eruption fifteen years ago and has remained almost wholly uninhabited since. The statistics from this area are not included below

1	Census (in the areas completed in 1917)	9,024
2	Examined	8,997
3	Found infected .. .	5,702
4	Given first treatment .	5,355
5	Cured .	4,849
	Percentage of infected cured .	85 0%
	Percentage of treated cured .	90 6%
6	Removed from area (or dead) (1·5%)	86
7.	Remaining in area uncured (13 5%)	767
	(a) not located	7
	(b) refused treatment . .	148
	(c) medical reasons . . .	283
	(d) under treatment ..	329

*Seychelles (1917) **

The campaign was inaugurated on February 8th, 1917. Intensive measures were put in operation in two districts of the South Mahe area and two districts of the Central Mahe area; embracing the south and central parts of the principal island of the Seychelles group. Dr J. F. KENDRICK had control of the field operations. Most of the people derive their livelihood from the coconut. On the 1st August a special sanitary enactment came into effect to compel houseowners to construct latrines and prohibiting the disposition of excreta elsewhere than in approved latrines. Nearly every home has since been suitably provided.

1.	Census (in areas completed during 1917)	8,133
2.	Examined	8,111
3.	Found Infected	7,778
4.	Given first treatment	7,600
5.	Cured	7,011
	Percentage of infected cured ..	90 1%
	Percentage of treated cured ..	92 3%
6.	Removed from area (or dead) 2·8%	220
7.	Remaining in area uncured 7·0%	547
	(a) not located	4
	(b) refused treatment	42
	(c) medical reasons.. ..	173
	(d) under treatment	328

* Report (No. 7359) to the International Health Board.

*Grenada (1917).**

Operations, on the intensive plan, were extended during 1917 to four more areas in the Parish of St John—viz., Grand Roy, Marigot, Concord and Mount Nesbit—and to four new areas in the Parish of St George—viz., Morne Jaloux, Belmont, Boca and St Paul's.

Of 1,780 homes inspected during the year only 230 had latrine accommodation on the first visit and only 264 on the last inspection, although there is a law to compel an installation in every home.

1. Census (in areas completed in 1917)	7,974
2. Examined	7,810
3. Found Infected	5,242
4. Given first treatment ..	4,902
5 Cured	3,894
Percentage of infected cured ..	74.3%
Percentage of treated cured ..	79.4%
6 Removed from area (or dead) ..	196
7 Remaining in area uncured (22%)	1,152
(a) Not located	31
(b) Refused	239
(c) Medical reasons	255
(d) Under treatment	627

British Guiana (1917)†

From October 1916 to September 1917 intensive work was carried out in the Belfield-Mahaica area on the East coast of Demerara, extending from Vigilance at the eastern end of the Plaisance area, eastward along the seacoast for twelve miles to the village of Mahaica; from thence southward along the Mahaica creek the area terminates at the village Virginia.

As a variant in the routine treatment Dr. DERSHIMER has replaced salts by a "Compound cathartic pill" and in place of milk sugar finds sodium bicarbonate a satisfactory diluent of thymol.

There is continued sanitary improvement in the Colony. During 1917, 1,911 new latrines were installed and 2,858 old ones repaired.

1 Census (area completed in 1917) ..	16,382
2. Examined	16,044
3. Found infected	9,508
4. Given first treatment	8,906
5. Cured	7,505
Percentage of infected cured ..	78.9%
Percentage treated cured	84.3%
6. Removed from area (or dead) ..	706
7. Remaining in area uncured (13.6%)	1,297
(a) refused treatment	177
(b) medical reasons	579
(c) under treatment	541

* Report (No. 7409) to the International Health Board from Dec. 1914 to Dec. 1917 by Dr. COLWELL.

† Report (No. 7352) to the International Health Board. March 1914 to Dec. 1917.

During the year the work was handicapped by flooding through breakdown of the sea defences and by the rice planting.

*Siam (1917).**

Dr M E BARNES was responsible for the campaign during the year. Much of the effort has been centred on to the problem in the city of Chiangmai, and has mainly been of a dispensary type

Work on the "intensive" plan was commenced in the last quarter of the year and was completed in seven districts located within Chiangmai as well as in the village of Nong Pratest. It is remarked that in routine examination the ova of the fluke *Opisthorchis viverrini* were frequently seen.

The people in the district grow rice, and this complicates the problem of prevention and the administration of treatment.

1 Census	—
2 Examined	10,518
3. Found infected .. (73 7%)	7,750
4. Given first treatment (62 5%)	5,415
5. Cured	1,000
Percentage infected cured	—
Percentage treated cured	18 5%

Dr. Barnes thinks that a well organised municipal pail system would be the best solution of the sanitary problem in Chiangmai, were funds available. Under present conditions the methods recommended for the disposal of night soil in the areas worked were, (a) Fly-proof pit latrines. The sandy soil makes these safe if they can be protected against flooding. In some cases the walls of the latrine require to be built up with brick to a point well above the highest water mark, the walls being well banked with earth and sodded. (b) Public fly-proof latrines on mounds. In villages which are flooded too deeply for latrines of type (a) several public latrines, constructed in a similar manner on mounds, were recommended. Their contents require to be regularly burnt out. (c) The bucket system. (d) Liquefaction tanks. These are recommended for private homes where the expense was no objection.

One difficulty is however the almost universal use of sticks of wood instead of toilet paper which is very scarce.

The drinking water in and around Chiangmai is drawn almost entirely from open wells 20 to 30 feet deep.

British Honduras (1917) †

It was realised that without the provision of adequate latrine accommodation treatment would be useless as reinfection was bound to take place almost immediately. Treatment was therefore confined to those places where suitable latrine accommodation had been

* Report (No. 7410) to the International Health Board. Feb. to Dec. 1917.

† MSS. Report on the Progress of the Anti-hookworm Campaign in British Honduras to 15th Dec. 1917, in Despatch to the Colonial Office No. 32.

provided. After their necessity had been explained by the sanitary authorities and the police the people readily erected latrines. At the present time every place in the colony is suitably provided except in certain Carib and Indian villages and in wood-cutting camps which are constantly shifting.

The only district in which examination and treatment was completed during 1917 was the Orange Walk district. A certain amount of work was in progress in the Corozal District. 3,259 persons were examined, 514 were found to be infected and of these 483 received treatment. The infection shown is therefore only 15·7 per cent or one third that estimated by Dr. HACKETT after his survey during 1916. The discrepancy is thus explained:—(a) a large number of persons successfully treated by Dr. HACKETT and the District Medical Officers (b) Dr. HACKETT's estimate was probably somewhat high, as those persons chiefly who felt the need of treatment came for examination. The reduction in the percentage of persons affected was most noticeable in two villages, August Pine Ridge which had only 16 per cent infected instead of 84 per cent and Guinea Grass where the estimate of 67 per cent fell to 13 per cent. The population of the district is about 5,000, of whom 1,000 are wood-cutters living in shifting camps in the bush, as of the remainder 3,259 examined only 741 were unaccounted for. The P M O considers that as a result of Dr. HACKETT's campaign the percentage of infections fell from 44 to 15 per cent and as a result of the present campaign it fell further from 15·7 to 3·3 per cent.

*Guatemala (1917).**

During the year a Presidential decree made the installation and proper maintenance of latrines obligatory. The crowding of thousands of people into the public parks after the earthquake on December 23 impressed on the government and the people the urgent need and importance of latrines.

In Dr. STRUSE'S Report it is emphasized that thymol is dangerous in Guatemala because the Indian cannot be trusted to abstain from food and especially from alcohol during treatment.

The work undertaken and completed during the year (1917) was as follows —

1. Census	13,993
2. Examined	12,934
3. Found infected (54·9%)	7,095
4. Given first treatment	6,693
5. Cured	5,997
Percentage of infected cured	—
Percentage of treated cured	89·6%

Salvador (1916-17).†

The Republic is divided into fourteen states. There are 252 townships, 1,939 villages and the estimated population is 1,267,588.

* Report (No. 7390) to the International Health Board. March 1915 to Dec. 1917.

† Report (No. 7399) to the International Health Board. March 1916 to Dec. 1917.

The work was inaugurated in the State San Salvador in which the capital is situated. This State has 20 municipalities and 134 villages. Excluding the capital the population is about 82,265. That of the capital is approximately 65,000. Towards the end of the year the campaign was extended to the State of Sonsonate. The majority of the inhabitants of Salvador depend upon agriculture for a livelihood. There are many large sugar and coffee estates, most of the employees live in small one or two room shacks or huts with dirt floors. Sanitation is most primitive. The chief diet is black beans, cakes of ground corn and water, and strong black coffee. In the towns houses are built of wood, cane and clay and have usually tiled floors. There are but few latrines. During the rainy season much stagnant water is found in the streets. Drinking water is scarce and is supplied to troughs or basins in the centre of the town, whence the inhabitants carry it to their houses in pitchers; most of the inhabitants go bare-footed. Hookworm infection is extensive and of moderate intensity. Anaemia is generally not pronounced, and general anasarca and ulcerations with marked wasting are but infrequently encountered. Dr. C. A. BAILEY in his report to the International Health Board states that in the towns and fincas the intensive method was followed. In the surrounding country the dispensary plan was found advisable. The work completed by both methods up to December 1917 (i.e., over a period of eighteen months) entailed the examination of 23,459 persons of whom 45.3 per cent were found infected, of these 77.7 per cent, i.e., 8,265, received first treatment and 48.6 per cent. were found subsequently to have been cured. A large number of the inhabitants live in isolated rural districts or in mountain passes and are inaccessible so far as intensive work is concerned.

Of the 23,459 persons examined 69 per cent harboured *Ascaris*, 41.8 per cent. *Trichocephalus*, 2.3 per cent. *Strongyloides*, 1.1 per cent. *Taenia*.

*Ceylon (1916-1917).**

During 1917 the campaign continued as a branch of the Government Medical Department. The work begun in the Matale area in 1916 was concluded, and similar operations were inaugurated and completed in Dickoya, Bogawantalawa and Norwood. Towards the close of the year new ground was broken in Elpitiya and Gorakopola but the figures are held over until next year. The intensive plan was followed but in Matale it was found advisable to open a dispensary. The intensive work was limited to estate labourers; where attempts were made to reach the villagers the time and money expended were incommensurate with the results. The districts in which work was completed were almost entirely made up of prosperous rubber or tea estates supervised by Englishmen and worked by Tamil labourers recruited from Southern India. The coolies live in double rows of back to back rooms. The children frequently start in the fields at the age of six. They are therefore uneducated and superstitious. The examination and treatment of all labourers has been made compulsory but the law is not often resorted to as it is desirable to secure

* Report (No. 7388) to the International Health Board. Jan. 1916 to Dec. 1917.

the voluntary co-operation of the people. Attempts by their leaders to dissuade the coolies from taking treatment are firmly dealt with. The senior sanitary officer of the government had no authority to supervise estate sanitation however. In November 1916 a law was passed making it compulsory for all estates in Ceylon to provide adequate latrine accommodation for their labourers within one year.

The statistics given are based upon completed work from January 1916 to December 1917. A certain amount of dispensary work is included in the total number of persons microscopically examined. The total given is 50,473 of whom 48,971 or 97 per cent were found infected. In the strictly intensive work on the estates the census showed a population of 44,797 of whom 42,143 were examined.

	Total.	Dickoya.	Bogawan- talawa.	Norwood.	Matala.
1. Census Estates	44,797	15,315	11,032	6,478	12,372
2. Examined	42,143	14,302	10,271	5,662	11,908
3. Found infected	41,103	13,667	10,114	5,497	11,825
4. Given first treatment	35,785	11,081	9,499	4,385	10,830
5. Cured	32,943	10,378	9,280	4,216	9,069
Percentage of infected cured	80.1%	75.9%	91.8%	76.7%	76.7%
Percentage of treated cured					
6. Removed from area (or dead)	2247	419	135	160	1533
7. Remaining in area un- cured (14.4%)	5913	2870 (21%)	699 (6.9%)	1121 (20.4%)	1223 (10%)
(a) not located	1				
(b) refused (5%)	225				
(c) medical reasons (12.6%)	5183				
(d) under treatment	504				

Of other parasites found *Ascaris* occurred in 86.1 per cent and *Trichocephalus* in 47.5 per cent. *Taenia* occurred three times and *Strongyloides* 19 times in 46,705 persons. A complete and systematic search was only made for hookworm eggs—so that these results may be misleading.

Dr. WINSOR reports a series of experiments made with the object of combining both purgative and anthelmintic in a single treatment. He combined croton oil and chenopodium in the proportion of 120 minims of the former to 10 ounces of the latter. Half the dose of croton-oil-chenopodium was administered at 7 a.m., the other half one hour later. From one and a half to two hours after the second dose a small amount of castor oil was given. No evening purge preceded the vermifuge. For the first treatment the maximum adult dose of chenopodium recommended was 32 minims and for children between five and ten years of age 1 minim for each year of age.

The croton oil is a purge that is very reliable, especially in countries where enormous doses of salts are required to produce purgation

The croton-oil-chenopodium is not accompanied by griping, probably on account of the carminative action of the chenopodium. Further the treatment is not nearly so exhausting, the toxic effects of the chenopodium are not so noticeable, a larger percentage of worms are expelled than by an equal dose of chenopodium alone and the percentage of cures is slightly higher.

*Dutch Guiana (1917) **

Headquarters of the campaign, carried out by Dr KIBLER, during 1917, were situated first at Katwyk in the Commewyne area and later at Paramaribo. The statistics of completed work during the year are given below. 94.8 per cent of the persons examined up to December 31, 1917, have been found to harbour some parasite. 14.9 per cent had *Ascaris*, 9.2 per cent *Trichocephalus*, 8 per cent *Bilharzia mansoni*, *Strongyloides*, *Taenia* and *Oxyuris* were only found in one or two cases. The haemoglobin index of 711 persons before treatment was 71 per cent. and six months or more after treatment it was found to have risen to 90 per cent.

1. Census	13,256
2. Examined	13,159
3. Found Infected	12,045
4. Given first treatment	11,133
5. Cured	10,102
Percentage of infected cured	83.9 $\frac{0}{0}$
Percentage of treated cured ..	90.7 $\frac{0}{0}$
6. Removed	998
7. Remaining uncured (7.8%)	945
(a) refused treatment ..	135
(b) medical reasons ..	480
(c) under treatment	330

Panama (1917) †

The campaign continued during the year under the supervision of the Department of Uncinariasis, an organisation affiliated with the Department of Public Works and with the National Board of Health. Dr. W. T. BARNES was in charge throughout 1917. All the work follows the *dispensary* method. Approximately half of the Republic had been covered by the operations completed up to December 31st 1917. In the areas in which work was completed in 1917, 16,676 persons were examined and 84.5 per cent. were found infected. First treatment was administered to 94.1 per cent of the infected and 27.3 per cent. of those so treated were reported cured. In addition 3,290 other persons were examined and 2,960 treated in areas in which the work continues.

Of other parasites the records given are:—*Ascaris* 41 per cent., *Trichocephalus* 13.6 per cent, *Strongyloides* 1.7 per cent, *Taenia* .4 per cent. and *Oxyuris* .4 per cent. The results of 13,047 haemoglobin

* Report (No. 7340) to the International Health Board, Oct. 1915 to Dec. 1917.

† Report (No. 7398) to the International Health Board, July 1914 to Dec. 1917.

examinations give a general index of 61. The work of latrine installation has by no means kept pace with the work of examination and treatment. In the smaller towns scarcely more than 10 per cent of the houses have latrine accommodation and these are unknown throughout the rural regions. An attempt has been made to accustom the people to sanitary habits by installing latrines at the schools and for the general use at points where they will serve the greatest number. Although quite satisfactory sanitary laws exist they are not enforced and the indifference of the people and officials has largely nullified the efforts made.

*Costa Rica (1917).**

The operations for the relief and control of hookworm disease are conducted by a division of the national Department of Police with headquarters in the City of San José under the direction of Dr. Louis SCHAPIRO. The Republic is divided into seven provinces and 46 cantons. During 1917 the work was extended to include the cantons of Escasu and Mora in the province San José. The cantons of Carillo and Nicova in Guanacaste, Turrialba and Alvarado in Cartago and the district of Juan Vinas in the canton of Jiminez in the province of Cartago. The Census and other figures for the areas completed during 1917 are as follows —

1 Census ..	53,846
2 Examined	48,488
3 Found Infected	29,940
4. Given first treatment ..	28,909
5. Cured	12,971
Percentage of treated cured	44.9%

In addition 3,655 other persons were examined and 1,355 treated during 1917 in the canton of Alajuelita. The work there is still in progress.

Brazil (1917).†

The survey of the State of Rio de Janeiro was well under way at the opening of the year 1917. An intensive campaign was inaugurated in May in Rio Bonito and is still in progress. A preliminary survey was commenced in December in the State of Sao Paulo. The units are now in operation, viz., in the Federal District, the State of Rio and in Sao Paulo.

In the Federal District the area selected for the campaign is the Ilha do Governador, an island in the Bay of Rio de Janeiro about forty-five minutes by ferry from the federal capital. This island has a population of about ten thousand and is about eleven miles long by three wide. The excellent city water of Rio is piped to the island under the bay. The supply does not extend into individual houses but taps are provided at street corners and along roads.†

In the State of Rio the area selected was the municipal division of Rio Bonito, one of the chief sources of corn and mandioca in the

* Report (No. 7406) to the International Health Board. Sept. 1914 to Dec. 1917.

† Report (No. 7339) to the International Health Board for the year 1917.

state. It has a small county seat of about 3,000 inhabitants and a large scattered rural population in mountainous country with neither roads nor sanitation.

No statistics of the work done during 1917 are given here as the campaign in these districts are still in progress

Sanitation—The City of Rio de Janeiro is under the immediate supervision of the Federal Public Health Service and has long had a statute requiring septic tanks of a certain form in all localities where sewer connection is not possible. In the rural portions of the Federal District this law has hitherto been a dead letter but the authorities are now enforcing it vigorously in co-operation with the therapeutic campaign now in progress. In the houses where there is no running water or whose owners are not financially able to instal septic tanks of the approved type special permission is given to construct small pit latrines as an emergency measure

The present situation in the agricultural regions of Brazil is however one of complete destitution with regard to latrines. The big coffee and sugar planters and the small farmers pay no attention to the sanitation question. Fortunately the school houses are nearly all provided with toilets with flushing basins and the young generation is learning their use and convenience. Privies with removable receptacles do not exist and the idea does not appeal to the population. In the State of Rio the rural population goes unshod or wears sandals with wooden soles which are usually removed and carried in the hand in case the way is muddy. In San Paulo and the Federal District shoes are almost universally used although they are laid aside by the agricultural labourer while working

R. T. L.

[The various "Reports to the International Health Board" referred to in the footnotes in the Hookworm Campaign Section are lithographic Reports issued by the Rockefeller Foundation, New York, and kindly placed at the disposal of the Bureau by the Director of the International Health Board.—ED.]

CHOLERA.

- i. SELIGMANN (E) **Epidemiologie der Berliner Cholerafälle, 1918.** [Epidemiology of the Berlin Cholera Cases of 1918]—*Berlin. Klin. Woch* 1918 Dec 9. Vol 55. No 49. pp 1161–1163
- ii. MAGNUS-LEVY (A). **Die Cholera-epidemie des Herbstes 1918 in Berlin** [The Cholera Epidemic of Autumn 1918 in Berlin]—*Ibid* pp 1163–1164.

1 A small epidemic in Berlin, October 1918; eighteen cases with a mortality of 78 per cent. Suspicions of cholera were not at first aroused, the earlier cases being regarded as food poisonings traceable to a butcher's shop where horse meat was sold. Of the 18 cases 16 stood in relationship to this minced horse meat. An answer to the question—How was the meat infected?—could not be given with certainty. Either it arrived from West Prussia already infected (but there were no cases of cholera known of in West Prussia or on the line of transit) or it was infected in the butcher's shop. As this shop was regarded as a centre of secret food traffic which was visited by soldiers and labourers from eastern parts where cholera is prevalent, the most likely conclusion was that the first presumable case (the butcher's assistant: diagnosis death from "intussusception") was caused by contact and he infected the mince-meat. The mortality figure was regarded as misleading, a number of mild cases being probably overlooked.

ii. Some clinical remarks on the above epidemic containing nothing new.

H. Schütze.

- SANARELLI (G.). i. **De la Pathogénie du choléra. La défense naturelle du péritoine contre les vibrions cholériques.**—*C.R. Acad. Sci.* 1919. Jan. 6. Vol 168. No. 1. pp 69–72.
- ii. **Patogenesi del colera (4a Nota preliminare). Il gastro-enterotropismo dei vibrioni.** [The Pathogenicity of Cholera; the Gastric-intestinal Tropism of the Vibrios]—*Ann. d'Igiene.* 1919. Mch. 31. Vol. 39 No. 3. pp. 129–131.

1 The author discusses the result of intraperitoneal injections of cholera vibrios (*a*) when the dose is non-lethal:—Here as soon as introduced, the vibrios are taken up by the lymphatics, particularly those of the omentum, and enter the blood-stream at about the end of three minutes. The leucopenia in the peritoneal fluid that results is not caused by a destruction of cells but by their emigration on to the omentum where they deposit themselves, offering a barrier to the entrance of the vibrios. The entrance of the vibrios into the blood-stream induces a dilation of capillaries and a diapedesis of polynuclear cells into the peritoneal cavity which is occasionally so intense that haemorrhages accompany it. These polynuclears also establish themselves on the surface of the omentum. The intensity of the vibriosaemia abates generally between the second and third hours. Occasional vibrios may be found alive in the blood up to the twelfth hour; after that the blood is always sterile. In the meantime, ingestion of those vibrios not able to penetrate the barrier of leucocytes

begins and all organisms become during the first hours swollen and globular in shape, though this does not imply their immediate death. When the last vibrio has been phagocytised the peritoneum is invaded by fresh leucocytes, large mononuclears which ingest and rapidly digest the first leucocytes, the peritoneum thus returning to its original normal condition.

(b) When the dose is a fatal one.—In this case the vibriœnaemia is more intense and of longer duration and at the same time a marked diapedesis is not produced. The barrier of leucocytes on the omental surface is consequently incomplete. At the end of the third hour, the phagocytic action begins to fail. Only the bactericidal action of the peritoneal fluid remains and from the beginning suffices to retard the vibrios, later it increases in power with the result that most of the vibrios undergo morphological changes. At about the tenth hour an important diapedesis of leucocytes takes place. This tardy revival of the peritoneal defences cannot check the development of the infection but achieves the sterility of the peritoneum which is found at autopsy. Guinea-pigs killed by a peritoneal injection of cholera vibrios do not therefore die of a peritonitis: the cause of death must be sought elsewhere.

ii. The toxic action of *V. cholerae* in the guinea-pig is not upon the nervous centres, as some (PFLEGER) suppose, but on the mucous membrane of the alimentary canal, an acute gastro-enteritis resulting. Contrary to what has been affirmed up till now, the blood of the guinea-pig has no bactericidal power for cholera vibrios. So that vibrios entering the bloodstream from the peritoneum multiply there and subsequently are excreted through the intestinal walls. Thus when a guinea-pig receives a lethal dose of cholera vibrios, the animal does not die of peritonitis nor of intoxication nor general infection but of a gastro-enteritis.

Vibrios are also excreted into the stomach. Arriving through the circulatory system at the stomach walls, the organisms bring about anatomical and functional changes which result in the stomach contents becoming alkaline; the vibrios injected into the peritoneum and arriving at the stomach are now no longer destroyed but able to develop abundantly.

H. S.

PANGANIBAN (C. S.) & SCHÖEHL (Otto). **Preservation of Cholera Stool Specimens for Delayed Bacteriologic Examination.**—*Philippine Jl. Sci.* Sec. B. Trop. Med. 1918. Sept. Vol. 13. No. 5. pp. 275-280.

The methods of keeping cholera vibrios alive in stool specimens which the authors tested, were the addition of glycerine, of sodium chloride and of ox bile.

To portions of a stool artificially infected with cholera vibrios equal quantities of glycerine (40, 50 and 60 per cent.), of sodium chloride solution (0.5-30 per cent.) and of ox bile (50, 75 and 100 per cent.) were added and the mixtures stood at room temperature, 32° C.

While from the glycerine specimens no vibrios could be cultivated (by peptone water, enrichment and Dieudonné plating) after the

4th day, from the sodium chloride samples (0.5–5 per cent.) and from all the bile specimens vibrios could be grown after as long as 5 weeks.

By infecting stools with diminishing numbers of cholera vibrios it appeared that pure ox bile had a better conserving effect than 1 per cent. sodium chloride when the vibrios were present in very small numbers.

H. S.

DUMAS (Juhen). Réactions des vibrions cholériques dans les milieux liquides glycogénés tourne-solés.—*C.R. Soc. Biol.* 1919. May 24. Vol. 82 No 15. pp 547–550.

The paper describes the acidification of the following medium by the cholera and pseudo-cholera groups of vibrios.

Peptone Chapoteau .	1 gram
Sodium chloride .	0.5 "
Glycogen, pure	0.5 "
Litmus .	Q. S.
Distilled water	100 grams.

After the peptone is dissolved, the sodium chloride is added and the medium made alkaline by adding 5 cc normal soda per litre beyond the litmus neutral point. After having boiled gently for ten minutes, the medium is filtered and the glycogen added. Litmus is dropped in and the whole sterilised at 110° C. for a quarter of an hour. The chief intestinal bacteria, such as *B. coli*, *faecalis alcaligenes*, *proteus*, *pyocyaneus*, *typhosus*, *paratyphosus* A & B, Gaertner and the dysenteries do not produce acid. The only organism not a vibrio which is mentioned as acidifying the medium is *B anthracis*. Two vibrios (Corfu 50 and Hamburg) are apparently exceptions and produce no acid. It is hoped that the medium may be useful diagnostically.

H. S.

LAUNOY (L.) & BEBAT-PONSAN (S.). Sur la protéase du Vibron cholérique.—*C. R. Soc. Biol.* 1919. May 31. Vol. 82. No. 16. pp. 578–581.

An examination of the action of various sera (rabbit, horse, human and guinea-pig) on the proteolytic power of *V. cholerae*. A peptone broth culture (4 days at 37° and 4 at 21°) passed through a candle filter (L3) was used and for the sake of comparison, in a further series, trypsin; the substance for digestion was gelatine. In both series the inhibitory action of the sera in varying quantities was determined and it was found that while all 4 sera interfered with the proteolytic power of trypsin, on the cholera ferment they had no effect.

H. S.

SNAPPER (I.). La dissociation du sang et de l'hémoglobine par les vibrions cholériques et les vibrions de Tor.—*Nedrl. Tijdschr. v. Geneesk.* 1918. Sept. 14. p. 848. [Summarised in *Bull. Office Intern. d'Hyg. Publique.* 1918. Dec. Vol. 10. No. 12. p 1392.]

The difference between the superficially similar zones that develop round *V. cholerae* and El Tor vibrio colonies on blood agar, is

explained by the author as follows. In the more or less colourless zone round *V. cholerae* colonies haematin can be detected, thus showing that haemoglobin has been split. Round colonies of El Tor vibrios even traces of haematin can scarcely be found. The pallid zone is a result of haemolysis with a diffusion of the liberated haemoglobin into the medium generally. Confirmation is obtained by plating on haemoglobin agar where El Tor colonies form no zones. On bile-blood agar plates, *V. cholerae* shows particularly good zones, but El Tor barely an indication of them. It seems probable that El Tor vibrios were originally able to attack haemoglobin as well as haemolyse the red cells but that the former property has been lost by a prolonged laboratory existence, as happens in the case of the normal *V. cholerae* itself. The haemolytic property of El Tor vibrios, which *V. cholerae* never possesses, on the other hand has persisted.

H. S.

BESSON (A.) RANQUE (A.) & SENEZ (Ch.) Sur un Vibrio Intestinal à caractères spéciaux "*Vibrio iners*."—*C. R. Soc. Biol.* 1918. Nov. 23. Vol. 81. No. 21. pp. 1097-1098

While examining stools from dysentery bacilli the authors isolated on several occasions a vibrio with the following characters—a pleomorphic organism, now short and comma-like, now long resembling a spirillum, mobile, Gram negative, gelatine not liquefied, milk not coagulated, growth on potatoes thick and brown, no indol; lactose, saccharose, maltose, levulose, glucose, mannite, dulcitol, glycerine not fermented; no virulence for rabbits or guinea-pigs.

An immune serum prepared from one of the strains agglutinated 4 of the 8 strains to 10^{-1} , 2 to 10^{-1} , while the remaining 2, like *V. cholerae*, were not agglutinated at all. In spite of the differences in agglutination the authors regard the 8 strains as identical because of their identical cultural characteristics and because of these it is proposed to give the organism the name *Vibrio iners*.

H. S.

ELIAS (Herbert). Alkalitherapie bei komatöser Cholera. [Alkali Therapy in Cholera Cases with Coma.]—*Therap. Monatsh.* 1918. Sept. Vol. 32. No. 9. pp. 311-315.

Struck by the resemblance between the symptoms of feverless cholera and diabetic coma, particularly in very severe cases of the former with deep and somewhat accelerated breathing, prolonged inspiration and expiration and complete unconsciousness, the writer tried an alkali therapy for the assumed acidosis; the usual treatment with saline injections, subcutaneous and intravenous, and heart stimulants benefited but for a short time, 2-5 hours; a second injection was usually without result, so that nearly all these cases died within a short time. The administration of alkaline fluids was not found of service in cases of acute cholera or typhoidal cholera without the symptoms of acidosis. The writer's method was to inject $\frac{1}{2}$ — $\frac{3}{4}$ liter of warm 4 per cent. Na_2CO_3 solution intravenously. Improvement resulted lasting for 12-24 hours and sometimes leading to recovery; in other cases after 24 hours a second injection is necessary. In about a quarter of the cases thus treated recovery took place. In no cases

were bad results observed beyond occasional small subcutaneous haemorrhages. But the writer indicates that MAGNUS-LEVY's recommendation of NaHCO_3 is to be preferred, as it is simpler to use and necroses are avoided.

H. S.

BAYLISS (W. M.) **Intravenous Injections in Cholera.**—*Brit. Med. Jl.* 1919 June 7. pp. 722-723.

Although in the treatment of cholera intravenous injections of hypertonic (12 per cent.) saline are of greater value than those of isotonic strength owing to the raised salt content preventing by osmotic pressure the escape of fluid into the tissues, still, since the blood-vessel-walls are permeable to salts, these pass into the tissues and an equal concentration being established there, the additional fluid is no longer to be kept within the circulatory system.

The writer suggests the use of a colloid, such as gum acacia, which cannot pass through the walls of the blood-vessels, but does exert osmotic pressure. Solutions of 6 or 7 per cent in 0.9 per cent. sodium chloride have been used in the treatment of haemorrhage and wound-shock.

It is pointed out that the calcium carbonate in gum acacia would help to neutralize any acidosis present, the calcium itself being possibly useful for its physiological action

H. S.

FRIEDBERGER (E.) **Zur Frage der Typhus- und Cholera-schutzimpfung. I. Mitteilung.** Ergibt sich auf Grund der bis jetzt vorliegenden authentischen Zahlen ein Erfolg der Impfungen gegen Typhus und Cholera im Krieg? [Prophylactic Typhoid and Cholera Inoculations. Are there Grounds for considering Them Effective?]
—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1919. Apl. 28. Vol. 28 No. 3-5. pp. 119-185. With 17 charts.

A paper read in 1917 whose publication because of its heterodoxy has been forbidden until now. It deals mainly with typhoid prophylaxis. It criticises very severely the opinion that there is proof of cholera inoculation having influenced the course of an epidemic: a rapid diminution in the size and severity of an epidemic is to be expected and does occur, even when inoculation has not been carried out. The writer indicates how invalid is the comparison of incidence and mortality between inoculated soldiers and uninoculated civilians because of the difference in the range of ages in the two groups. Selected males of young to middle-age years are naturally more resistant than a body of people with ages ranging from infancy to extreme old age. A false idea of mortality is also obtained among civilians because, unlike among soldiers, the less severe cases can escape detection, the people trying to avoid the coercion of sanitary measures.

The writer also points out that the occurrence of sporadic cases of cholera among inoculated troops without an ensuing epidemic must not be regarded as evidence of the benefits of prophylactic inoculation, for the same thing is also observed among the uninoculated,

(e.g., Mecca pilgrims). The fact that other intestinal disorders such as the dysenteries have during the war been suppressed without inoculation and as effectively as cholera was, shows that general hygienic measures and not inoculation have been the operating cause in the suppression of cholera too. [It is remarkable that no attempt is made to obtain figures for the comparison of incidence and mortality among inoculated and uninoculated exposed to the same epidemic in the same way.]

H. S.

YABE (S) [Practical Use of Cholera Sensitized Vaccine.]—*Saikingaku Zasshi*. (*Jl of Bacteriology*) 1917 Nov 10 No 266. pp 932-4

[From Review by R. G. MILLS.]

There were 301,224 persons vaccinated out of a total population of Tokyo and suburbs of 3,055,946, or 10 per cent. Of these 3 who had not received the full treatment sickened and 2 died. The records cover the non-vaccinated population of Tokyo proper and include 2,661,767 people, among these there were 680 cases and 442 deaths. A morbidity in the first instance of 0.1 per 10,000 and in the last of 2.47. The mortality in the two cases was the same or 63 per cent. The method was applied to large factories and workshops with complete success and in those families where only part was vaccinated, the sickness was confined strictly to those not thus protected. In all this number of injections not a single dangerous symptom was noted and few reactions occurred. In 80-95 per cent. there was slight local pain or none at all and 2 per cent temporarily absented themselves from work on this account.

H. S.

LEPROSY.

MALTA. Reports on Leprosy in Malta By a Committee appointed by His Excellency the Governor in 1917.—21 pp 2 maps 1919. Malta Government Printing Office

The committee appointed by the Governor in 1917 considered the question from the following aspects :—

- A —Leprosy in Malta.
- B.—Segregation of lepers.
- C —Treatment of lepers.
- D —Research on Leprosy.

A —The disease has been known in the islands since 1687. In 1883 it was noted that the number of lepers was increasing and a medical committee was appointed to report on the subject. It was met with almost entirely among the rural population, with a preference for certain villages. As an outcome of this Report an Ordinance (No VII, 1895) was passed providing for :—

- (a) Compulsory notification of cases of leprosy.
- (b) Examination of the cases by a Board of 5 medical men
- (c) Detention in the leper asylum, for the whole period of their disease, of persons certified by the Board.

This law was put into operation for males when the male wing of the leper-asylum at Inghieret was ready for patients in 1900, and not until 1912 for females when the female wing was completed. In 1900, 81 males were admitted, and in 1912 there were 63 male patients, and in that year 37 females were segregated. In 1917 there were 72 males and 40 females in the asylum.

It appears that the disease is most frequent in villages in the N.W. side of Malta, and that the towns and suburbs are remarkably free from it suggesting the idea of old foci of infection. Agricultural labourers are mostly affected. About three-fourths of the cases are "tubercular or mixed"

B —Segregation. The committee regards leprosy as a communicable disease and contagious—"although in a low degree." They consider segregation specially advisable—owing to comparative rarity of leprosy and the feasibility of isolation and the long duration and scanty results of treatment, rendering a leper a likely source of danger.

Malta with its limited area and small population is in a specially advantageous position for benefiting from segregation. The committee considers that this should be compulsory and that in Malta isolation at home should not be encouraged.

The conclusions arrived at are :—

"1.—Leprosy exists in Malta to an extent which renders necessary the adoption of active measures to check its spread.

"2.—Segregation is the only effectual means we have at our disposal for checking the spread of leprosy

"3.—The system of segregation as practised at present in these Islands is that best adapted to the local conditions.

"4.—The lepers confined in the Asylum are entitled to the best possible treatment.

' 5.—Research on the disease should be actively pursued, since better knowledge of the life history of the organism of leprosy and of the mode of spread of the malady are necessary before we can hope to cope with the disease without resorting to segregation "

The committee further suggests :—

" 1.—Medical students should receive special instruction of a practical nature in the early signs and symptoms of leprosy, and one of the members of the Leprosy Board should be a bacteriologist.

" 2.—Patients who on account of the type of their disease are not likely to spread infection, should be discharged on condition that they report themselves periodically for examination and that they do not follow certain trades

" 3.—The Leper Asylum be known as the Leper Hospital.

" 4.—The area of land attached to the Leper Hospital be increased, and those lepers who are able to work should be encouraged to do so

" 5.—The head of the Charitable Institutions should be asked to furnish quarterly reports, on the number of lepers confined in the Hospital and on their condition and requirements; and the Leper Hospital be visited by a board appointed by the Governor, at least twice a year.

' 6.—A visiting physician to the Leper Hospital should be appointed, who would take charge of the treatment of the lepers and would give lectures and clinical instruction on leprosy to the medical students, and would carry out or direct research work on the disease."

This is a very able and comprehensive Report.

P S Abraham.

LIE (H. P.) *Einiges von die Uebertragbarkeit der Lepra insbesondere ihrer makulo-anaesthetischen Form.*—*Dermat. Wochenschrift.* 1918. Jan. 5 Vol. 66. No. 1 pp. 1-14. [Summarised in *Archiv f Schiff- u. Trop. Hyg.* 1919. Vol. 23. No 3.]

The writer expresses himself strongly in favour of the contagiousness of leprosy and alludes to a number of Norwegian cases in confirmation of his view.

In 481 marriages in which either or both parties had leprosy eruptions, the disease developed in 10.27 per cent. of the children whose fathers alone were affected, in 16.39 per cent. of those with leprosy mothers; and in 39.19 per cent. of those in which both parents were diseased. In the majority of cases the children were born healthy and became diseased in proportion to their close association with the affected parents. In districts where the inhabitants had been previously healthy the disease appeared after the advent of affected labourers from other places.

He believes that the maculo-anaesthetic cases are also contagious, and that the microscopic distinction between the bacilli bearing "leproma" and the macule does not hold. The bacilli in the latter may be brought in wandering cells in the deeper layers of the skin and ultimately reach the surface

P S A.

PERRIN (L.) & BRAC (G.). *Lèpre Indigène.*—*Presse Méd.* 1919. Feb. 13. Vol. 27. No. 9 pp. 77-78. With 4 figs

Marseilles, like Paris, always has its leprosy patients; but since the war commenced the number has increased through this town being the principal port of entry for the Colonial troops. Although the soldiers were at their departure from the recruiting centres medically

examined, many early or latent cases have come to light, and have after a variable period since arrival exhibited manifest cutaneous or nerve symptoms of the disease. The obvious or doubtful cases have been detained and isolated, until they could be repatriated—after having been minutely examined by the authors of this paper. In January 1918, some 50 cases were shown to Professor JEANSELME before their repatriation. Several photographs of some of the cases are published in the paper.

P. S. A.

MONTPELLIER (J.). Cinq observations nouvelles de lèpre recueillies à Alger.—*Bull. Soc. Path. Exot.* 1918 June Vol. 11. No. 6. pp. 433-438.

The author describes 5 new cases which have recently—1914 to 1917—come under his notice at Mustapha, Algiers. Two were Kabyles, one Spanish and two French, father and son.

With the exception of the Kabyles, he considers that the others were imported cases—having come from or residing in leprosy countries—such as Madagascar (the French cases). One of the Kabyles had also lived 6 months in Madagascar.

Of the five cases, four were maculo-nerve cases, and one, the old Frenchman, tuberculous.

P. S. A.

LEGER (Marcel). La Lèpre à la Guyane Française dans l'élément pénal : documents statistiques.—*Bull. Soc. Path. Exot.* 1918. Nov. Vol. 11. No. 9. pp. 793-799.

This paper gives an authoritative statistical account of leprosy at the Saint-Louis penal leprosy in French Guiana, which was established in 1895. In 1885, there were only two lepers, but since that date the number has gradually increased and is still manifestly increasing. In 1897, the number was 24; in 1910, 53; in 1914, 66; and in 1918, 73, 10 of whom are at the Acarouny leper asylum. The percentage of lepers among the prisoners is now over 9. Of the 63 at Saint-Louis, 21 are among the transported prisoners, 22 among those banished for life and 20 among those who have been set free. The author is inclined to think that there are probably some 500 lepers in the free populations of French Guiana or about 14 per cent. of the inhabitants.

According to THÉLÈME in 1912 there were interned at the Saint-Louis leprosy 39 Europeans, 3 Arabs, 3 Malaches, and 1 from Reunion, and 2 Chinamen.

P. S. A.

BORY (Louis). Maladie de Hansen avec accident primitif.—*Bull. Mém. Soc. Méd. Hôp. de Paris.* 1918. Dec. 5. 3 Ser. Vol. 24. No. 32-33. pp. 1060-1061.

A soldier from Madagascar was admitted in the hospital "28" at Troyes in July 1918 with disseminated macules, which had appeared eight months since his arrival in France. It was an undoubted case

of leprosy. On the right cheek there was a raised irregular tuberculated lesion completely anaesthetic, which was the first lesion observed in Madagascar at least ten months and possibly 18 months previously. The author regards this as the original point of entrance of the disease—or the leprosy “chancre”

A wax cast of the lesion was exhibited [but the history of the case given is very meagre and by no means convincing].

P. S. A

GRINKER (J). A Case of Anesthetic Leprosy. *Jl. Nerv. & Ment. Dis* 1918 Jan. Vol. 47. No. 1. pp 51-52

This is a typical example of anaesthetic leprosy. The patient was a young man aged 26, of Portuguese origin born in South America near a leprosy centre—family history negative. Some 18 months previously to being seen he was slightly wounded on the right leg, followed by pain and after a time a painless ulcer formed on the second toe. Loss of power was then observed in the ulnar fingers of the left hand followed by atrophy of the thenar eminence, numbness and paresis. A brownish discoloration of the skin appeared on the face and extended in patches and blotches over the trunk and limbs. Sensations of temperature and pain were abolished but not the tactile—and there was no central paralysis. The diagnosis was between lepra and syringomyelia but the discoloration of the skin, the absence of spasticity in the lower extremities, of bulbar phenomena or of pathological reflexes, sufficiently negative the latter without demonstration of the bacilli.

P. S. A

RUDOLPH (Max). Sobre o bacillo da lepra em ixodidas. [Note on the Presence of Leprosy Bacilli in Ixodidae.]—*Brazil Medico* 1918 Nov. 2 Vol. 32. No. 44. p. 345.

The author found Hansen's bacilli in the intestines of *Amblyomma ragennense* (Fabricius), which had sucked blood from a patient suffering from nodular leprosy, during a febrile period. The presence of the bacilli was still established after as long a period as 13 days from the last blood-sucking, though all the elements of human blood had been digested. The bacilli stained characteristically by the methods of Ziehl and Gram-Much. With Unna's process some took a yellow, others a blue coloration, the latter signifying, according to Unna, vitality of the bacilli. It was not necessary that the ticks should suck from the nodules.

F. S. A

CONI (E. R.). [Leprosy.]—*Semana Medica*. Buenos Aires. 1918. Nov. 21. Vol. 25. No. 47. p. 692. [Summarized in *Jl. Amer. Med. Assoc.* 1919. March 15.]

Coni protests against segregating lepers in remote islands. He considers it better to have an accessible colony where the lepers can occasionally see their relatives and friends. Agricultural colonies give them occupation and make their lot more

hearable He appeals to the Legislature to provide for compulsory declaration of leprosy. No census has ever been taken of the lepers in Argentina.

P. S. A.

CADBURY (William W.). **The Treatment of Lepers as Out-Patients.**—*China Medical Jl.* 1918. May. Vol. 32. No. 3. pp. 226-233.

Dr Cadbury tabulates notes of 37 cases of leprosy at Canton, treated by HEISER's method from 1915 to the end of 1917—most of them only in 1917. The majority had been affected for more than a year, and several for 10 years; they were all typical, but none very advanced; many were of mixed tuberculus and anaesthetic type. Gluteal injections were given once a week commencing with 1 ml, gradually increasing to a dose of 8 or 9 mls, and then gradually decreasing to 1 ml. Each patient was also given a prescription of iron and arsenic.

Results were noted in 26 cases. Five showed signs of complete arrest; "for months no new areas had appeared," all nodular areas had subsided, and anaesthesia in some entirely disappeared. In 16 there was definite improvement. In 5 no change occurred. In none was the condition worse than when the treatment was commenced. Complications occasionally occurred—oedema of the hands, necrosis or abscess, pain at the site of injection, and oil embolism in the lung.

Intravenous injection of sodium gynocardate was tried in other cases, without much change, but improvement was noted in these cases after the Heiser treatment was given.

The author considers that intramuscular injections of the chaulmoogra oil mixture is the most effective treatment for leprosy; that resulting complications though inconvenient need not to be regarded as serious; and that the treatment may be successfully employed in an out-patient dispensary.

P. S. A.

CONNAL (A.). **Some Notes on the Treatment of Leprosy.**—*Jl. Trop. Med & Hyg.* Mar. 1. Vol. 22. No. 5. pp. 37-40

Treatment by fair methods has been given a trial at the Yaba Leper Asylum, Lagos, since 1910. (1) Chaulmoogra oil has been in constant use. (2) NASTIN Drs BEALE BROWNE and MACPHERSON used this for over 4 years. (3) HEISER's combination of chaulmoogra oil with camphorated oil and resorcin was given in certain cases from May 1916 until June 1917. (4) Gynocardate of soda was chiefly used during the latter half of 1917.

A short history is given of 20 cases in which the remedies were used and from what can be gathered from the histories, nastin seems to have been of least benefit, and sodium gynocardate appears to have given the best results. The author remarks upon the difficulty of forming a true estimate of the value of any one drug; in his opinion none of the above remedies can be regarded as a specific for leprosy. Relapses have occurred in treated as well as in untreated cases; and improvement has been noted in the entire absence of drug administration. In the majority of the cases, bacilli continued to be found in nasal smears but not in many of the gynocardate cases.

P. S. A.

MUIR (E.). Supplementary Report on Treatment of Lepers with Gynecardate of Soda "A."—*Indian Med. Gaz.* 1919. Apl. Vol. 54. No 4. pp 130-134

Dr. Muir gives a further report on the progress of the 30 cases treated with gynecardate of soda "A." Most of them showed continued improvement and some had lost all symptoms—but in one of the latter there was a return of symptoms and there was a return "due to overdosage": another case had a relapse "due to overdosage."

Twenty-three other cases were put under the treatment and are now reported. The chief difficulty in many cases was the destruction of the veins with the sodium gynecardate A solution, with blocking Sodium morrhuate with which he experimented is not so destructive to the veins. To get the maximum effect, he recommends the following system of dosage:—

1st week—

1. Sodium gynecardate "A," 5 cc. intravenously 1st day.
2. Sodium gynecardate "A," 25 cc. sod. morrhuate 25, 3rd day.
3. Sodium morrhuate, 5 cc. intramuscularly, 5th day.

2nd week—

4. Sodium gynecardate "A," 1 cc. intravenously, 1st day.
5. Sodium gynecardate "A," 5 cc. sod. morrhuate 5 cc., 3rd day.
6. Sodium morrhuate. 1 cc. intramuscularly, 5th day

The dosage to be increased by 5 cc week by week up to 5 cc provided there be no marked febrile reaction or other danger signal. If the latter the dose should be halved, and again gradually raised to 1 cc below the dose that produced the reaction. The injections should be continued for some months after entire disappearance of symptoms.

P. S. A.

MUIR (E.). Report on Treatment of Thirty Lepers with Sodium Gynecardate "A."—*Indian Med. Gaz.* 1918. June. Vol. 53. No. 6. pp. 202-213. With 1 plate.

This is a report of three months' treatment with Sir L. ROGERS' sodium gynecardate A in 30 lepers at the Maubhang Asylum. A 3 per cent. solution with 1 per cent. phenol and 1 per cent. sodium citrate was intravenously injected, commencing with half a cc, increasing by 1 cc up to 5 cc. thrice weekly.

In general the most rapid progress was recorded in the youngest and earliest cases, but not always. Three of the cases who had been ill 5, 4 and 18 years respectively have entirely lost all traces of anaesthesia and the nodular swelling found in the last of them had practically disappeared.

The results on the whole were very satisfactory and better than with "Leprolin" or with the original gynecardate of soda. The author considers that the new treatment should be widely adopted in the 40 or more leper asylums now in India. He remarks on the extensive prevalence of leprosy, much greater than can be gathered from available statistics.

P. S. A.

CARTHEW (M). Cases of Leprosy in the Bangkok Main Prison treated with Sodium Gynecardate and Sodium Gynecardate "A."—*Indian Med. Gaz.* 1918 Nov. Vol. 53. No. 11 pp 407-409. With 1 plate

Dr Carthew records 13 cases of leprosy treated at Bangkok, Siam, with sodium gynecardate intravenously and by the mouth, from April until November 1917. Seven of the cases had comparatively recently—since their imprisonment—shown symptoms of the disease. Nine were macula-anaesthetic cases, 4 nuxed.

All the lesions disappeared in 2 cases, very marked improvement in 3; considerable improvement in 6; and very slight or no improvement in 2. Neither the duration nor type of the disease seemed to influence the rapidity of improvement. The improvement in general health as well as in the special symptoms indicate this treatment in all cases of leprosy, and although it is still too early to state definitely that sodium gynecardate is specific, the results so far are very encouraging.

P S A.

LEGER (Marcel). *Lépra murium à la Guyane française.*—*Bull Soc Path Exot* 1919. Apl 9. Vol 12. No 4. pp. 169-171

The author has examined a number of rats in French Guiana and found that a comparatively high number were infected with the bacillus of Stefansky. In twelve young rats one was affected. In 37 adults, 13 exhibited the bacillus, or 35 per cent, and the proportion of females to males was greater, only the glandular form nearly always was found. He remarks upon the wide distribution of rat leprosy, and upon the large proportion of cases in French Guiana, where human leprosy is also common.

P. S. A.

BERIBERI.

McCARRISON (R.). The Pathogenesis of Deficiency Disease.—*Indian J. Med. Res.* 1919. Jan. Vol. 6 No. 3 pp. 275-355.
With 25 figs

The very careful and well-thought out series of experiments here described throw much light upon the etiology of deficiency diseases, on the study of which the author has been engaged for several years. He draws attention to the little knowledge we have had up to the present of the effects caused by a deficiency of vitamins upon the glandular organs, particularly the endocrine structures. This gap he has to a large extent filled by the present researches on the histology and pathology of the internal organs of birds experimentally studied. It is not only the nervous system that suffers from lack of vitamins: the effects on other organs are indicated by the metabolic disorders of children with gastro-intestinal symptoms.

The research work is divided into three parts: (1) The effects of vitamin deficiency brought about in healthy birds by starvation—true inanition; (2) the effects in healthy birds by a diet too high in carbohydrates and deficient in vitamins; (3) the latter, plus the influence of toxic or bacterial agencies [This is in continuation of his previous work with *snipe* infections (this *Bulletin*, Vol 5, p. 116)]. The importance is shown of proving in all cases that the blood and organs are sterile, before any accurate conclusions can be drawn as to the effects of a food deficiency, for of 142 birds suffering from polyneuritis 94 were septicaemic, as were 6 of the 63 controls.

Birds die from simple inanition in about 12 days, and besides loss of body-weight show enlarged adrenals with increased adrenalin output, oedema at the auricular-ventricular junction, and atrophy, most marked in the case of thymus, testicles, spleen, ovaries and pancreas. The adrenals, brain, pituitary, thyroids, kidneys, and heart, appear to be nourished at the expense of the thymus, reproductive organs, spleen, pancreas and liver. The same changes though less marked are found in birds fed on polished rice only, indicating that chronic inanition has an important rôle in the origin of deficiency diseases.

Knowing the necessity of keeping experimental birds free from bacterial infections, elaborate precautions were taken and semi-wild birds were used. The incubation period for polyneuritis in pigeons is usually considered to be 15-25 days. In the absence of bacterial infection the average duration was 67 days, and the author states that 100 days at least without nerve symptoms must elapse before preventive treatment can be considered successful. If the symptoms develop within this period the blood and tissues of the birds must be proved to be sterile. The author had only one instance of rapid onset of neuritic symptoms when there was no secondary infection. Sex and aggregation of birds has a considerable influence on the development of the disease; males are more susceptible, and isolated birds remain free from symptoms longer than those that are congregated together, both factors tending to exhaust earlier the

resources of the endocrine glands on which much of the morbid processes of deficiency diseases appear to depend. The clinical symptoms observed are divided into three types:

- (1) Cerebellar symptoms predominating.
- (2). Polyneuritis without cerebellar symptoms
- (3) Asthenia.

Fulminating cases were only found when septicaemia was present. The periodicity of the seizures were suggestive of attacks of tetany, though the characters of the fits are different, as if due to the accumulation in the body of the toxic products of disordered metabolism.

A rise in temperature is always associated with a septicaemic infection, and it is the easiest noticed indication of this. The loss of weight was found to amount to about $\frac{1}{3}$ of the original, and it is mainly due to muscular wasting and thinning of the bony framework. Very considerable variations in the pathological findings are noted by observers in different localities, and these may depend on the secondary infections present: this deserves the most careful consideration, as shown by the author's work on the *B. sursestifer* infection (1914), an organism which in this series was replaced by the *B. pyocyaneus* and *B. coli comm.*, and a third indefinite organism. From a careful examination of weights of the organs these conditions are noted:

- (1) Unchanged—Pituitary.
- (2) Hypertrophied—Adrenals.
- (3) Atrophied—Thymus, testicle, spleen, ovary, pancreas, heart, liver, thyroid, kidney, brain.

All these were examined in detail and the results are very fully described. Nothing, the author states, is more remarkable than the appearance of the atrophied testicles and hypertrophy of neighbouring adrenals, the latter becoming actually larger than the testicles, and the adrenal content is proportionate to the increase in size of the glands in cases of beriberi (in birds), as shown by rise in blood pressure of animals after injection of extract of the organs.

Lack of vitamins when associated with a diet too rich in starch is thus seen to lead to a disordered function of the whole endocrine system. This disturbance of function is in part due to nuclear starvation of the organs which compose this system, and in part to failure of their sympathetic control, and in part due to disturbance of the correlation. This disordered endocrine function leads in turn to imperfect carbo-hydrate assimilation, disturbance of carbo-hydrate metabolism, and resultant muscular atrophy.

In the examination of nerves the author found evidence of a very high percentage of degeneration among the control birds, 33 per cent. Similar results were found on examination of the vagi, slight degenerative patches existed in 19 out of 30 polyneuritic birds and in six of the control pigeons, and it was absent in certain of the diseased ones. Birds with marked cerebellar convulsive seizures after treatment with vitamin extract may in a short time regain all their functions. [This is a well known and oft repeated observation, but nevertheless very striking.] It would appear that the paralytic symptoms are mainly functional, not the result of a neuritis, but of a disturbance in the function of the cells of the brain and cord, though

in 4-15 per cent the degeneration may be complete and residual paralysis follows

In Part 3 the earlier experiments with *B. suispestifer* are quoted and further ones are described in which beriberi symptoms were produced by infection with these micro-organisms. In these cases though the adrenals were enlarged there was no increase in adrenalin content. In the presence of a condition produced by a deficiency diet bacterial organisms multiply exceptionally, and though in man they are not necessary factors for the causation of beriberi, it is easy to see how they may favour the onset of the symptoms and determine the endemic or epidemic spread of the disease.

An interesting table is given contrasting the post-mortem appearance of avian, human and septicaemic avian beriberi, this, though incomplete for man, indicates the lines of further research. It is noticeable that in birds the heart is generally atrophied whereas in man it is hypertrophied, together with the liver and spleen; these changes are in part probably not dependent on the deficiency of vitamins alone but to concomitant causes, not present in the pigeons with sterile organs. The whole digestive system is very easily disordered by an unnatural diet; by this, parasitic and bacterial invasion of the gastro-intestinal tract and bacterial migration are facilitated. It is probable that there is an infective factor at work in many cases described as beriberi, in addition to the essential dietetic factor. If we admit the prime importance of the deficiency of accessory food factors, an infective or parasitic agency which consumes vitamins required for the human body may be a determining factor in the genesis of beriberi.

The author considers the term "anti-neuritic vitamin" is inaccurate, for the morbid state is not confined to the nervous system and the chemical nature of the food factor has not been proved to contain nitrogen or belong to the amines. The main source of these vitamins is known to be germs of seeds or eggs, they are nuclear ingredients essential for nourishment of the living nucleus. The term "Nucleoplast" is therefore suggested.

General Conclusions.

"1. The absence of certain accessory food factors from the dietary—improperly termed 'anti-neuritic'—leads not only to functional and degenerative changes in the central nervous system but to similar changes in every organ and tissue of the body. The morbid state to which their absence gives rise is not a neuritis.

"2. The symptom-complex resulting from the absence of these substances is due (a) to chronic inanition, (b) to derangement of function of the organs of digestion and assimilation, (c) to disordered endocrine function especially of the adrenal glands and (d) to malnutrition of the nervous system.

"3. Certain organs undergo hypertrophy; others atrophy. Those which hypertrophy are the adrenals. Those which atrophy, and in the order of severity named, are the thymus, the testicles, the spleen, the ovary, the pancreas, the heart, the liver, the kidneys, the stomach, the thyroid and the brain.

"The pituitary gland showed a slight tendency to enlargement in adult male pigeons only.

"4. The enlargement of the adrenals is a true hypertrophy; it is associated with a proportionate increase of the glands' adrenalin-content. The amount of adrenalin in the hypertrophied organ is area for area,

approximately the same as that found in the adrenals in health. The hypertrophy is equally well-marked in both sexes.

" 5. Oedema has invariably (100 per cent.) been associated with great hypertrophy of the adrenal glands. 80 per cent. of all cases having great hypertrophy of these organs had oedema in some form. The amount of adrenalin, as determined by physiological methods, in such cases has been considerably in excess of that found in cases not presenting this symptom, and greatly in excess of that found in normal adrenals.

" 6. Inanition gives rise to a similar state of adrenal hypertrophy; and to a similar state of atrophy of other organs—the brain excepted.

" 7. The oedema of inanition and of beriberi is believed to be initiated by the increased intracapillary pressure which results from the increased production of adrenalin, acting in association with malnutrition of the tissues. Failure of the circulation and venous stasis may subsequently contribute to it. Age is an important factor determining its occurrence.

" 8. Wet beriberi and dry beriberi are essentially the same disease; the former differs from the latter in the greater derangement of the adrenal glands.

" 9. Gastric, intestinal, biliary and pancreatic disorders are important consequences of a dietary too rich in starch and too poor in 'vitamines' and other essential constituents of the food. It is suggested that some of the obscure metabolic disorders of childhood might be examined from this view-point as well as from that of endocrine gland starvation.

" 10. A state of acidosis results from the absence of so-called 'anti-neuritic vitamins'; this state is due to the imperfect metabolism of carbohydrates and to acid fermentation of starches in the intestinal tract. Clinically, it is evidenced in pigeons by progressive slowing and deepening of the respirations.

" 11. Great atrophy of muscular tissue results from deficiency of 'anti-neuritic vitamins'; it is due in part to the disturbance of carbohydrate metabolism in consequence of disordered endocrine function, in part to the action of the adrenals in supplying blood to the vegetative organs of the body at the expense of the muscles.

" 12. Profound atrophy of the reproductive organs is an important consequence of 'vitaminic' deficiency. It leads to the cessation of the function of spermatogenesis. In the human subject such degrees of atrophy would result in sterility in males and in amenorrhoea and sterility in females. This finding is held to account in great measure for the occurrence of 'War Amenorrhoea.'

" 13. The central nervous system atrophies little; the paralytic symptoms are due mainly to impaired functional activity of nerve cells, much more rarely to their degeneration.

" 14. It is thought that because of their atrophy out of all proportion to other tissues the thymus, the testicles, the ovary and the spleen provide a reserve of accessory food factors for use on occasions of metabolic stress. This reserve, however, is rapidly exhausted.

" 15. The bones are thinned and there is a loss of bone-marrow.

" 16. The red cells of the blood are diminished by about 25 per cent.

" 17. The whole morbid process is believed to be the result of nuclear starvation of all tissue cells. Even the adrenals, which alone of all organs undergo hypertrophy, show on section changes in some of their cells indicative of nuclear starvation.

" 18. Finally, although deficiency of certain accessory food factors is the essential etiological factor in the genesis of beriberi, it is held that infectious and parasitic agencies may often be important causes determining the onset of symptoms.

" 'Vitaminic' deficiency renders the body very liable to be overrun by the rank growth of bacteria. It is probable that varying metabolic disturbances may determine the character of these growths."

[FUNK believed that there was a close relationship between food vitamins and the internal glands, and made careful examination of eight pigeons suffering from the disease. He found a great diminution in size of the glands in every case with microscopical degeneration, the thymus being affected most. No note is made of the condition

of the adrenals (FUNK (C) and DOUGLAS, this *Bulletin*, Vol. 4, p. 146.) OHNO (S) (*loc cit*, Vol. 12, p. 372), has found hypertrophy of the supra-renals with increase of adrenalin in 10 acute and 2 nursing cases of beriberi.]

P. W. Bassett-Smith.

WALSHE (F. M. R.) The "Food Deficiency" or "Vitamine" Theory in its Application to Infantile Beriberi.—*British Jl. of Children's Dis.* 1918. Oct.-Dec. Vol. 15. pp. 258-268.

The author gives a very closely reasoned and critical survey of the deficiency theory of beriberi and other cognate diseases, in which he attempts to show that VEDDER'S "building up" theory is untenable, and that the views of BRADDON and COOPER more easily meet the facts. In the author's opinion something more than the deficiency of vitamins is necessary to cause disease; viz, it is the defective metabolism of carbohydrates brought about by the want of the vitamins, which produces a toxic by-product or *positive* factor as yet unknown, causing an intoxication chiefly affecting the nervous system.

In children the disease may be acute and rapidly fatal, unless the child be removed from the breast, though the infant at birth may be well nourished. How is it possible for a vitamine-starved mother to supply this substance to the foetus in utero any more than to the suckling infant? There is no evidence to show that in the pre-natal period there has been any failure to build up the nervous system as would be the case if there had been a continuous starvation of vitamins, it is only after ingestion of carbohydrates, etc., in the milk that the disease appears. The author suggests that "the abnormal toxic metabolite presumed to exist in adult beriberi passing into the infant in the maternal milk produces the disease," and this may be cured in a week by administration of extract of rice-polishings or anti-neuritic substances. The author has developed his most ingenious theory and the possibility of the actual anti-neuritic substance being an enzyme. (See this *Bulletin*, Vol. 13, p. 331.) This view is compatible with the belief that beriberi is associated with a food deficiency, and it reconciles the old toxæmic theory with this.

A word of warning is added to those who are interested in this fascinating line of research, that the clinico-pathological study of the disease must not be neglected for speculative theories.

P. W. B-S.

FRAGA (Clementino). Carencia alimentar e beriberi.—*Brazil Medico.* 1919. Feb. 22 & Mar. 1. Vol. 33. Nos. 8 & 9. pp. 57-61, 65-68.

The author discusses the still vexed question of the aetiology of beriberi, rejects the view that polyneuritis gallinarum is merely beriberi in the fowl and maintains that the latter disease is not a pure deficiency disease but is rather an infection, dietary deficiency being merely a predisposing and not the essential cause. He gives details of an experiment carried out with their consent on nine inmates of

the Bahia gaol They were fed exclusively on rice and beans (*Phaseolus vulgaris*) The food was all decorticated and in some cases sterilised in addition The experiment was carried out for periods varying from 36 to 38 days, being brought to a conclusion in each case by the entire refusal of the subject to continue it further The subjects all lost weight and suffered from severe digestive troubles of various kinds; not one, however, exhibited any paralytic or neuritic symptom or any symptom in the least suggestive of beriberi and this in spite of the fact that the prison in which the experiment was carried out was an old beriberi locale. [Had this experiment been continued for a period of three months, it might have led to some useful result.—Ed.]

F. S. A.

KUMAGAWA (M.). Über einen gegen Hühner-Beriberi wirksamen Bestandteil der Reiskele "Nutritin." (Vitamin od. Oryzanin.) [On a Constituent of Rice Bran effective against Beriberi in Fowls ("Nutritin").]—*Mitt. Med. Gesell., Tokyo.* 1919. March. Vol. 33. No. 6. p. 2.

The author first refers to methods for extracting the active anti-neuritic substances from rice bran, and he then describes in detail the one which he employs. 70 kgms. of rice bran were used, and from this a decoction was made with 3 per cent. sulphuric acid. This was repeatedly precipitated, and extracted, using silver nitrate, baryta water, alcohol, ether, etc. A purin compound was first obtained, then a white precipitate which contained the active ingredient Finally about 3 grms. of extract were obtained of which 1-2 cc. of a 1 per cent. solution was found to be curative for a fowl in the early stages of the disease. This substance crystallised in conglomerate needle-shaped crystals which consisted for the most part of adenin. The pure effective substance could not be obtained in a crystalline form.

P. W. B-S.

REVIEWS.

BYAM (W.) [Maj R.A.M.C.], CARROLL (J. H.) [Capt. U.S.R.], CHURCHILL (J. H.) [Capt. R.A.M.C. (I.)], DIMOND (Lyn) [Capt. R.A.M.C.], SORAPTURE (V. E.) [Capt. R.A.M.C.], WILSON (R. M.) [Capt. R.A.M.C.] and LLOYD (LL.) [Capt. R.A.M.C. (T.)]. Entomologist. **Trench Fever. A Louse-Borne Disease.** With an Introduction by Lt.-Gen. Sir T. H. GOODWIN, K.C.B. A Foreword by Major-Gen. Sir David BRUCE, K.C.B., F.R.S., A.M.S. and a Summary of the Report of the American Trench Fever Commission by Lt. R. H. VERCOE, R.A.M.C.—pp. xiv + 196. 1919. London: H. Frowde, Hodder & Stoughton, Oxford University Press. [10s 6d net]

Readers of this *Bulletin* will remember that in No. 1 of Vol. 13, issued Jan. 15th, 1919, there appeared a review of the "Report" of the American Red Cross Trench Fever Committee. In that review the opportunity was seized to consider, also, the work of the "War Office Trench Fever Committee" as published in the *Trans. Soc. Trop. Med. & Hygiene* for June, 1918.—"To the latter Committee is due the honour of having been the first to demonstrate by experiments the part played by the louse in the transmission of "trench fever" (BRUCE).—The book now received for review gives a more complete account of the work done by Major W. Byam and his colleagues.

It is accompanied by a short letter of courteous interest and approval from the Director General Army Medical Service, and by a "Foreword" from the pen of Sir David Bruce. In the "Foreword" wisdom and humour hand in hand usher the louse to his place among the pathological insects. The louse might plead that mankind has, in the past, done much to encourage the parasitic union. Thus, since we cannot impute malice, the induction ceremony should be, and is, performed without show of resentment!

Sir David Bruce then gives a short sketch of the research history of Trench Fever containing the quotation given above. He refers to man as the only "susceptible animal" and states that "without human volunteers no progress could have been made." We dealt with the courage, intelligence and devotion of the volunteers, American and English, in the review already mentioned.

Photographs of the English volunteers make up the "Frontispiece" of "Trench Fever." In eight interesting chapters we get an account of the acute disease, its incidence and symptoms, with illustrative temperature charts; the mode of transmission; degree of immunity; distribution of louse-borne diseases, the chronic stage and after effects of the infection, prognosis, treatment and prophylaxis. Four Appendices are added. No. 1 and No. 2 contain details of experimental work, No. 3 is a letter from a discharged patient whose case is fully described in Chapter 6. In appendix No. 4, Lt. Vercoe has compiled a summary of the "Report of the Commission of the American Red Cross Research Committee on Trench Fever." This Report, as already stated, was reviewed in January of this year. In certain important particulars the findings of the "W.O.T.F.C." differ from those of the American workers.

The latter found:—1. That infection was conveyed in the saliva, faeces and urine; 2. That the disease was transmitted naturally by the bite of the louse. Major Byam writes, p. 31:—"The infectivity of saliva and faeces we have not attempted to determine, but two attempts to infect with the dried sediment of trench fever urines have given negative results (Experiments 69 and 78)." In the report read before the "Society for Tropical Medicine and Hygiene" it was clearly stated that there was no evidence of infection by the bite alone. A "table" on page 57 of Major Byam's book shows that out of eight experiments only two were positive. Every precaution was taken to exclude contamination and "in experiment

69 over 40,000 bites were received, and on the 35th day from the commencement of the experiment trench fever developed. The attack was mild and followed by one short relapse (maximum temperature 99.2°), the patient being convalescent by the 10th day. The final verdict is that "the bites of lice may possibly cause sufficient lesion to enable the virus to enter the body." The causal organism of Trench Fever is not definitely known. Major Byam discusses the possible connection of "Rickettsia" bodies with Trench Fever. These microbes are also found in the blood of patients suffering from typhus fever or from Rocky Mountain Fever. They are more readily found in the invertebrate agent which transmits these diseases. ARKWRIGHT, BACOT and DUNCAN carried out research work on Rickettsia in collaboration with the W.O. Committee on Trench Fever and the results of their investigations are published (with Plate) in the *Trans. Soc. Trop. Med. & Hyg.*, Feb., 1919.

"Trench Fever" is a valuable monograph, a record of good work. The value of the text is increased by typical charts, diagrams and a map showing the geographical distribution of louse-borne diseases. This book is of convenient size and well printed. If it contains any typographical errors they have escaped notice.

J. H. T. Walsh.

ROGERS (Sir Leonard) [Kt., C.I.E., F.R.S., Lt.-Col. I.M.S.].
Fevers in the Tropics. 3rd Edition.—pp. viii.+404. 9 plates.
 1919. London: Oxford University Press. Henry Frowde,
 Hodder & Stoughton. [Price 30s. net.]

New Editions of fiction or biography are, in the main, reprints bearing witness to popularity and profitable sale. Medical and other scientific works, with rare exceptions, bring little profit to their authors and the advancing tide of knowledge compels new editions.

In 1910 Sir Leonard Rogers was content with an "Addendum" which provided the 2nd edition of "*Fevers in the Tropics*" with the most important items of progress during the previous two years. Since that date, through years of peace and war, so many new facts, and the proper differentiation of a new disease, have been added to medical knowledge that "extensive alterations and additions have become necessary." "Epidemic Dropsy" (Beriberi) and "Tropical Liver Abscess" are omitted from the 3rd edition. Typhus fever is promoted to a special chapter and new sections dealing with Infective jaundice, due to spirochaetes, Oroya fever and "Trench Fever" have been added to the book.

The "Historical Introduction" with which other editions opened has been omitted and the technical methods for blood examination, with their results, no longer occupy a special chapter. The state of the blood and its pathological changes are described for each malady, and special technical methods are found where they are of most importance. Thus by judicious pruning and selection the author has given us a book which is less bulky than the 2nd edition which could only be read with comfort at a desk.

Within the group of chapters included in this edition of "*Fevers in the Tropics*" three stand out as owing much to the author's personal work: Chapter i "Kala-Azar," chapter xii "Malaria" and "Blackwater Fever," and chapter xiii "Epidemic Dengue—Sporadic Dengue or seven-day fever—Pappataci or three-day fever," and all three are brought as near to the date of publication as was possible. We owe much of our knowledge of the extra-corporal life of the kala-azar parasite to Sir Leonard Rogers, and to him in company with other investigators the sufferers from this terrible disease owe gratitude for relief and possible cure through injections of tartar emetic. As to the actual transmitters of the disease the argument favouring bugs, perhaps of more than one species, seems very strong. Safety in a new home only 400 yards away from infected dwellings eliminates not only flying insects, but such other insects as cling to clothing, hair or skin and could easily be conveyed to the clean domicile. Bugs feed in darkness, returning to their dens at the approach of light. Thus if old beds, etc., are left behind it is easy to prevent bugs from crossing the space which is sufficient for protection. Nevertheless although it

has been shown that the bed-bug may act as host of the flagellate form of *L. donovani*: proof of transmission of kala-azar by bugs from man to man is still wanting.

The long description of the various types of Malaria contains many illustrative cases with their temperature charts upon which the data of quinine administration are inscribed. At the present time when there is so much difference of opinion as to the best way of treating malaria it is pleasant to find that Sir Leonard Rogers is an advocate for moderate doses of quinine. He has found that "10 grain doses three times a day are sufficient to cut short an ordinary attack of malarial fever." Whether thus given, or in smaller doses at shorter intervals, thirty grains is quite enough for the day and the reviewer believes that the huge doses—90 grains or more—sometimes administered are not only unnecessary but not without danger to cell protoplasm. Equally in accord with the reviewer's experience are Sir Leonard's conclusions under "Hour of Administration" (p. 265).

In malignant tertian when Plasmodia are numerous and in other serious cases when cerebral symptoms are present or when vomiting is severe time is of vital importance and the intravenous method the quickest. The author discusses possible dangers but holds that its value has been proved. He lays special stress on the precautions by which this method of giving quinine may be made safe and effective. On page 270 a reference is given to two cases so treated: "(see page 244)." One case is found on p. 261 but we cannot find any mention of intravenous injection on p. 244. The value of "prophylactic" doses of quinine is not yet proved and we still wait for some experiment under conditions which would be decisive. Since infected anophelines do not wait until bed time to bite, the author wisely advises protection of exposed parts of the body during the evening hours "in intensely malarial places."

There have been some additions to Chapter viii, "Presuppurative Stage of Amoebic Hepatitis, Chapters ix "Low Fever," etc., and xvii including Cerebro-Spinal fever, Influenza and exanthematous diseases remain as in the 2nd edition. We might have expected some reference to the recent epidemic of influenza which caused probably as many deaths in India as that of 1889 and following years. The other chapters are, so far as experience and material have been available, up-to-date. But the "date" must of necessity lag behind the date of publication, especially when author and publisher are separated by some 6,000 miles. As examples of the way in which time beats the author it may be noticed that since the chapter on Amoebic hepatitis was closed we have learned that *E. histolytica* is widely distributed even in England, among persons never exposed to infection from abroad and among young soldiers doing hard work and showing no signs of ill health (*Trans. Soc. Trop. Med. & Hyg.*, July 1918); and that the reports of the American Committee and of the English War Office Committee (*BYAM, Trans. Soc. Trop. Med. & Hyg.*, June 1918) were not available for the new chapter on "Trench Fever."

Generally in accord with recognised zoological nomenclature the author still retains *Xenopsylla cheopis* in the genus *Pulex* and adheres to *Amoeba dysenterica* as the name for the parasite generally known as *Entamoeba histolytica*.

Printer's errors are very few—a letter missing here and there—and will not cause the reader any trouble. The "Dialzo Reaction" paragraph (p. 119) is heir to a mistake:—The experiments referred to were carried out not "in 1894" but in 1891. They were checked from time to time in 1892 and published in the *Ind. Med. Gaz.* for June 1893.

Two "plates" Nos. 1 and 2 of the 2nd Edition are omitted from this edition. A fine new Plate, "Trypanosomes" (BRUCE), faces p. 64. Of "Illustrations in the Text" No. 8 of the 2nd Edition is omitted, while No. 1 of that edition will be found on page 256 of the new book. Some new temperature charts have been introduced and two very useful new "tables" are:—No. xxx "Indian Malaria-carrying Anophelines," and "Bruce's Classification of African Trypanosomes" (p. 64).

J. H. T. W.

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[No 4.

KALA AZAR

- (1) ARAVANTINOS (Ana-tase) Méthode pour assurer l'innocuité parfaite de la ponction splénique.—*Bull Soc Path Exot.* 1918 Oct Vol 11 No 8 pp 701-705. With 3 figs.
- (2) NICOLLE (Charles) A propos de la technique de la ponction de la rate.—*Ibid.* Dec. No 10 pp. 814-815 With 1 plate.

(i) As a result of his extensive experience the author emphasizes the safety of splenic puncture when properly performed with sufficient speed, and recapitulates certain modifications in technique devised by him [this *Bulletin*, Vol. 8, p. 405]. Fatal cases are caused "almost exclusively" by endeavouring to aspirate splenic juice into the body of the syringe instead of resting satisfied with the amount drawn into the needle. Moisture of the needle is to be avoided as this dilutes the small quantity of material drawn up and renders microscopic examination unnecessarily tedious and difficult. For this reason the use of a platinum needle which can be flamed before use is recommended.

The author claims that with his technique no bandaging or precautions of any kind are required after splenic puncture in infants; neither is the preceding administration of calcium chloride necessary.

(ii) The author claims priority of ARAVANTINOS in the principles enunciated by him and criticizes the technique advocated in certain particulars. He deprecates the use of a spring-actuated piston and of a platinum needle. Platinum needles penetrate badly whilst the point is easily bent. The author prefers an ordinary glass syringe and considers a piston actuated by a spring unnecessary and even dangerous because a large needle is then required. He does not share ARAVANTINOS' views as to the safety of splenic puncture and advises a preceding examination of the peripheral blood. He enjoins half an hour's immobility for infants after the operation.

The point that kala azar patients are sometimes "veritable hæmophilics" is emphasized.

E. J. Wyler.

Low (George C.). *Intravenous Injections of Antimonium Tartaratum in Kala-Azar.*—*Brit. Med. J.* 1919. June 7. pp. 702-704

A case of kala azar is described which is of special interest because the infection was almost certainly acquired in Baghdad where the disease has not hitherto been reported as occurring indigenously and because the death of the patient from influenzal broncho-pneumonia just as clinical cure had occurred furnished an opportunity of ascertaining by post-mortem examination whether the parasites had actually been exterminated, and also what had been the pathological effect, if any, of the prolonged course of antimony

The course of treatment had extended over 4 months, a total of 64½ grams of tartar emetic having been administered intravenously, with a maximum dose of 2½ grams. Smears taken from the liver, spleen, bone-marrow, mesenteric and inguinal lymph glands, kidneys, lungs, and heart, and sections of the same organs failed to reveal the presence of leishmania. (They had been previously found by spleen puncture.) The disappearance of the parasites having been produced by the toxæmia of the influenzal pneumonia is mentioned as a possibility but "from the disappearance of all clinical signs early in the treatment after the large doses were employed it may be surmised that the sterilization took place about that time, or a little later, and at the time the influenza developed, there is little, if any, doubt that he was quite free from all infection."

As to the effect of the medication, otherwise than upon the parasites, the author asks whether one can produce a state of chronic poisoning by too large and too prolonged dosage and so seriously damage the patient's resisting power. In the case described, hitherto an apparently healthy man, the liver showed well marked cirrhosis, with fatty changes and was twice the normal size while the kidneys showed cloudy swelling and fatty changes. There were no changes of importance in the other viscera.

From a consideration of this and other cases which have been recorded, the author is of opinion that antimony given in large doses intravenously over long periods of time may produce fatty changes in the viscera and that toxic symptoms of an acute nature may sometimes supervene.

It is considered likely that, in the few cases in which post-mortem examination has been carried out, the fatty changes might have disappeared if the patients had not succumbed to intercurrent disease and that all cases show these changes in more or less degree, but recover from them on cessation of treatment.

The author's main practical conclusions in regard to treatment are:—

(1) That "antimony should not be given for longer periods than necessary and therefore it is important that some definite test should be evolved which will indicate when the infection of kala azar has disappeared and the patient is cured." [At present Rogers's standard of cure has to be accepted; absence of fever for a considerable time, steady gain in weight, and diminution in size of the spleen.] (2) "In all cases where antimonium tartaratum is given intravenously the patient should be confined to bed on the day of the injection and kept there till the day after and should be carefully watched throughout the course, any indications of gastric or constitutional disturbances at once contraindicating further injections. (3) Not more than two injections a week should be given, and the salt should not be given in too concentrated a form."

E. J. W.

HAMILL (Philip). **Intravenous Injection of Antimonium Tartaratum in Kala-Azar.** [Correspondence]—*Brit. Med. J.* 1919 July 5. p 28

This letter refers to the question raised in Dr Low's paper, summarized above, as to whether kala azar is indigenous in Mesopotamia, and mentions two cases, details of which are to be published, which are considered to have acquired their infection in that country. The interesting statement is made that the Arabs recognize two varieties of Oriental Sore, one of which is localized, while the other is followed by systemic infection and that before the war women came down to Basra from Baghdad for prophylactic inoculation with the former variety

E. J. W.

LEDINGHAM (J. C. G.). **Kala-Azar in Mesopotamia.** [Correspondence]—*Brit. Med. J.* 1919. July 19. pp. 88

From his personal knowledge of Dr Low's case (above) Colonel Ledingham considers that the infection may possibly have been acquired in India where the patient was stationed previously to his arrival in Mesopotamia. He lived with the patient in Mesopotamia for some time and notes that he suffered from constant headaches especially in the evenings together with a persistent cough of an asthmatic character. "If these premonitory symptoms be regarded as evidence of specific infection acquired in India, the incubation period would work out at five or six months."

Colonel Ledingham holds that "before satisfying oneself that kala azar may be contracted in Mesopotamia one must have definite evidence of its occurrence among natives."

E. J. W.

ROGERS (Leonard). **Colloid Antimony Sulphide intravenously in Kala-Azar. With a Note on Antimony Oxide orally.**—*Lancet.* 1919. Mch. 29. pp 505-506.

In a previous paper [this *Bulletin*, Vol. 12, p 199] the author's adoption of sod. antimony tartrate in preference to the potassium salt is recorded, together with three fatal cases of poisoning by the latter salt.

A case of death following the use of the sodium salt is now mentioned. The solution had become contaminated and it is advised to inject only freshly sterilized preparations or such as have been put up with $\frac{1}{2}$ per cent. carbolic acid. Doses may also be used if enclosed in sterile ampoules provided they remain perfectly clear.

Details of treatment with intravenous injections of colloidal antimony sulphide in ten cases are given. The table on the following page exhibits their salient features.

The method of preparation of the colloid by Mr. USHER, of the Central College, Bangalore, is fully described. The process is highly technical and those interested in it should consult the original paper.

The strength used is 1 in 500 Carbolyzed solutions keep well for several weeks, even in the rainy season. It was found by experiments on pigeons that its toxicity is markedly less than that of the soluble antimony salts hitherto used. Doses up to 20 cc. of a solution slightly weaker than 1 in 500 have been "repeatedly given intravenously without the least toxic effect and with excellent results in kala azar."

No. of case.	Age.	Duration in months	Days in hospital.	Days of Fever.	Cgs of drug to cessation of fever.	Total in cgs	Max dose in c cm of 1 in 500 solution.	Spleen below ribs in inches.	Diminution of spleen in inches	Weight in lbs on admission	Gain in weight in lbs.	Parasite in spleen blood before treatment	Result.
1	15	3½	104	16	7.2	25.1	10	3½	-2	65½	+22½	++	Cured.
2	16	12	106	10	5.0	25.6	10	5½	-1½	67½	+15½	++	
3	18	24	82	3	3.0	33.3	15	5½	-3	75	+18½	++	
4	30	7	74	12	10.4	37.4	20	6	-4½	98½	+14½	++	
5	30	8	37	9	10.0	18.0	20	4	-2½	78½	+11½	++	
6	20	4	52	-	-	22.0	10	4	-2	81½	+14½	++	
7	12	2½	62	16	4.6	8.0	5	4	-1½	56	+12	++	
8	22	6	99	14	6.1	14.0	9	7	-2	96	+20	++	
9	27	6	84	25	6.6	15.1	8	4½	-1	91	+12	++	
10	44	24	60	20	6.3	9.7	9	4½	-4	96	+7	+	

There may be transient pain in the loins and flushing of the face, and in a single case with a greatly enlarged spleen these symptoms were followed by drowsiness and later by excitement. In this case it was thought that an intolerance of the drug may have been developed, as the same dose had been given a week earlier without any such effect. The following table shows comparative data of treatment with sodium and potassium salts and the colloid preparation.

TABLE III — Comparison of Average Data of Treatment of Kala-azar with Tartar Emetic, Sodium Antimony Tartrate, and Colloid Antimony Sulphide.

	Tartar emetic.	Sodium antimony tartrate	Colloid antimony sulphide
Days in hospital	62.4 days	73.6 days	76 days*
Days fever under treatment	26.2 "	21.2 "	13.9 "
Cgs. of drug to cessation of fever	103 cg.	54 cg.	6.6 cg.
Total drug in cgs.	155 "	160 "	20.8 "
Decrease in spleen in inches	2.5 in.	2.2 in.	2.4 in.
Increase in weight in lbs.	7 lb.	8 lb	14.8 lb.
Max. dose of 2 per cent. solution	5.9 c cm.	5.7 c.cm	2 c.cm.*

*20 c.cm. of 1 in 500 solution equal to 2 c.cm. of a 2 per cent. solution.

The chief clinical advantages claimed for the colloid are (1) less toxicity, (2) rapid gain in weight, (3) smaller quantity of the drug

required for cure. It is more slowly excreted than tartar emetic or the sodium salt

The author's conclusions are —

"1 Colloid antimony sulphide therefore appears to be a distinct advance on soluble antimony tartrates in the treatment of Kala-azar

"2 It would also be well worth trying in sleeping sickness"

Treatment by oral administration of antimony oxide in an adult and in two boys 11 and 12 years of age was not successful. The author sent some antimony oxide for trial in quite young children to Dr DODDS PRICE in Assam. This was administered in twelve cases together with 5 per cent metallic antimony *unctions*. The results were encouraging

E. J. W

JOHNSTONE (Ernest Marshall) A Study of the Blood Changes in Kala-Azar after Splenectomy (with Incidental Reference to the Therapeutic Value of this Operation).—*China Med. Jl.* 1918. Nov. Vol 32. No. 6 pp 505-513 With 1 plate & 2 figs. , 1919. Jan Vol 33. No. 1. pp 1-12 With 5 figs

Splenectomy was performed in two cases of kala azar. These had previously been treated with tartar emetic intravenously by KORNs [see this *Bulletin*, Vol 12, p 207]. In one case the infection was severe, in the other mild. In the former there was temporary improvement, but sudden death supervened about three months after operation. This was considered to be due to thrombosis of large veins of the portal system and perhaps connected with the large increase of platelets observed in the blood, there was no autopsy. The latter patient gradually improved and was alive eighteen months after operation.

The blood changes ensuing on surgical interference in both cases are described in great detail and cannot here be summarized. It may be mentioned, however, that the leucocytosis during the first few days after splenectomy is described as consisting largely of a new type of cell, a polymorphonuclear neutrophile leucocyte with "horse-shoe" nucleus. The author considers these cells to be an intermediate form between a myelocyte and a mature neutrophilic polymorphonuclear leucocyte. He recommends splenectomy in certain types of the disease, but in view of the acknowledged curative action of treatment with antimony preparations when efficiently applied, his indications for surgical procedure need not be here set out.

E. J. W.

ACTON (Hugh W.). A Study of the Distribution of Bagdad Boils on the Body made with a View to discover the Transmitting Agent.—*Indian Jl. Med. Res.* 1919. Jan. Vol. 6. No. 3. pp. 262-274. With 5 charts.

As a result of his investigations the author believes the sandfly to be the transmitting agent of Oriental Sore. The distribution of 517 sores and 488 sandfly bites was mapped out on charts of the human body and are reproduced. The diagnosis in each case of Oriental Sore was confirmed by finding *L. tropica*. It was found that the distribution of the bites and the sores corresponded fairly accurately. It is inferred

from a consideration of the patient's dress (Indian soldiers), taken together with the distribution of the sores, that the transmitting agent must belong to the class of blood-sucking diptera and not to one which can hop or crawl under the clothes as a body louse, bed bug or flea, and that the insect does not bite through clothes. Also, the fact that the transmitting agent shows a preference for thin, hairless areas of skin implies that its proboscis is small and not very penetrating. These considerations suggest that the sandfly is the transmitting agent. Moreover, the fact that sores are twice as numerous on the arm as on the leg is explained by its habits, which are both diurnal and nocturnal.

Several cases of Oriental Sore occurred among the author's hospital personnel in Mesopotamia after being stationed there for nearly a year. By a careful study of the distribution of the bites of such other blood-sucking diptera found in that locality as might be incriminated he is able to exclude them as the possible causative agent, leaving the sandfly as the probable transmitter.

E. J. W.

EVANS (T. Garfield). **Treatment of Baghdad Bolls by Ionisation.**—*Indian Med Gaz.* 1918. Dec. Vol. 53. No. 12. pp. 448-449.

Thirteen cases were treated by zinc ionisation with satisfactory results. It is however only recorded in one case that L D bodies were found.

The technique is fully described and those interested in this form of treatment would do well to consult the original paper.

E. J. W.

NORIEGA DEL AGUILA (M). **Estudio sobre la trasmision de la leishmaniasis de America a los animales** [On the Transmission to Animals of American Leishmaniasis]—*Anales Fac. Med. de Lima.* Jan.-Feb. 1919. Vol. 2. No. 7. pp. 42-52. With 2 plates.

A summary of the work done and the results obtained up to the present in this field. The author gives the case of two guinea pigs he inoculated with matter from a human patient suffering from numerous ulcerative lesions. A positive result was obtained in one of the guinea-pigs and the author has 8 animals under observation. A detailed account is given of the appearances, microscopic and macroscopic, presented by the testicular lesion in the successfully inoculated guinea-pig. A coloured plate illustrates the forms of leishmania found. A brief bibliography concludes the paper.

F. S. Arnold.

Low (George C.). **Antimony in the Treatment of American Leishmaniasis of the Skin.**—*Brit. Med. Jl.* 1919. Apl. 19. pp. 479-480.

A detailed account of a case of American leishmaniasis seen in England, diagnosed by culture of the parasite from the sore.

Intravenous injections of tartar emetic were initiated with complete success, eight years after the patient first noticed symptoms of the disease.

The case is of special interest on account of its chronicity and of the absence of secondary buccal lesions.

E. J. W.

PROTOZOOLOGY.

SERGEANT (Et.). Influence du froid sur le développement du *Plasmodium relictum* chez le moustique. — *Bull. Soc. Path. Exot.* 1919. Apl. Vol. 12. No. 4. pp. 174–176.

In order to study the effects of temperature on the development of *Proteosoma* in mosquitoes, 198 insect (*Culex pipiens*) were used for feeding experiments on canaries, it being first ascertained that the latter were heavily infected with *Plasmodium relictum*.

Mosquitoes were placed, immediately after feeding, at an optimum temperature of 25°–30° for several days. 51 became infected out of 51 used. Where the temperature at 25° was after 24 hours lowered to 12° for 48 hours 34 insects utilised all became infected. When the temperature was kept at 12° for the first six hours after feeding and subsequently raised to 25°, the 7 mosquitoes experimented with became infected. The plasmodium developed at temperatures oscillating between 11.5° and 24° but it required 2 months instead of 12–15 days before sporozoites developed in three insects used. At the end of 5 months at a temperature varying between 8° and 25° infective sporozoites were not obtained in three experiments.

The Plasmodium did not always develop in the insect. The chances of infection diminish with prolongation of exposure at 12°. 3 days exposure at 12° immediately after biting does not always hinder development (1 case infected in 4). Eight days similar exposure gave no positive cases of infection with 4 insects.

F. W. O'Connor.

VON WASIELEWSKI (Th.) & WUELKER (G.). Die Haemoproteus-Infektion des Turmfalken. [The Haemoproteus Infection of the Kestrel.] — *Beihefte zum Arch. f. Schiffs- u. Trop.-Hyg.* 1918. Jan. Vol. 22. Suppl. 2. pp. 117–212. With 4 plates & 11 figs.

For the experiments the hawk (*Cerchneis tinnunculus* L.) was used owing to it being frequently parasitized by *Haemoproteus* and often by this parasite alone. The morphology of the parasite studied by the authors is described in its various forms. The second part of the work deals with studies of the parasite in the vertebrate host and experiments relating to transmission of infection. In the third part the systematic position of *Haemoproteus* is considered. The young birds are probably infected soon after leaving the egg, by *Carnus hemapterus* which inhabits the nest; possibly also by *Hippoboscidae* but not by *Culex*. The birds rarely suffer from the infection though some of the young may rarely succumb. The ague stage lasts 4 weeks.

A trypanosome also found in some of the hawks is described

F. W. O. C.

LEGER (Marcel). **Hémogregarines de Crapauds à la Guyane française.**
—*Bull. Soc. Path. Exot.* 1918. Nov. Vol. 11 No. 9 pp
788-791.

Free and intracorpuseular forms of Hemogregarines were observed in the blood of *Pipa americana*. The free forms measured 12μ by 2.5μ . The nucleus, which is near the anterior end, is round and compact. The protoplasm is clear and without granules or vacuoles. The intracorpuseular parasites are slightly smaller; one end is recurved. The nucleus is central. The containing corpuscle is normal or slightly enlarged.

Two Hemogregarines were found in *Bufo marinus*. One which bears a close resemblance to that described by DARLING, the author now names *H. darlingi*. In the other infection extra-corpuseular parasites were more numerous and measured $10-12\mu$ by $1-1.25\mu$. The anterior end is rounded and the posterior slightly tapered. Two forms were observed. Those probably female have a central compact nucleus and anterior to it a large vacuole. Between the vacuole and anterior end a large chromatin granule was observed. In other parasites believed to be males the nucleus is situated more anteriorly. There are always two vacuoles in its vicinity; 5 or 6 chromatin granules at the anterior extremity have the same colour reactions as the nucleus. Intracorpuseular forms were somewhat similar to those described. The posterior end was reflexed along one margin. The parasite appeared to have no effect on the cell host. It resembles the parasite described as *H. minima* Chaussat (*Drepanidium ranarum* Lancaster).

F. W. O'C.

DU TOIT (P. J). **Zur Systematik der Piroplasmen.** [Classification of the Piroplasms]—*Arch. f. Protistenk.* 1918. Aug. Vol. 39. No. 1 pp. 84-104. With figs.

FRANCA was the first to attempt a classification of Piroplasmata which he raised to the rank of family with five genera. *Piroplasma*, *Theileria*, *Nicolliia*, *Nuttallia*, and *Smithia*. This classification with certain reservations has been generally accepted. The work of GONDER showed that *P. mutans* differed greatly from *Th. parva*, the type species of the genus *Theileria* Theiler. GRAY and POWER proposed placing it in the genus *Nuttallia* and the author considers it to be a new genus, *Gonderia*.

The writer again refers to the creation of the genera, *Rossiella* and *Rangelia*. According to him the evolution of *Theileria* differs so much from other piroplasms that he considers it advisable to make a new family, *Theileridae*. This might include *Rangelia* which also undergoes multiplication by schizogony in the internal organs but which otherwise bears much resemblance to *Rossiella*.

He considers it necessary to retain *Piroplasma* and *Piroplasmidae* in addition to the genera *Babesia*, *Nicolliia*, *Nuttallia*, *Smithia*, *Rossiella* and *Gonderia*. The genus *Babesia* (= *Piroplasma*) should be divided into the subgenera *Babesia* S.S. (ex. *Babesiella*) and *Piroplasma* (Type *P. ligerninum*). In the latter is included *P. trautmani* a pig species.

The author criticises FRANCA's classification of the Haemosporidia. In the opinion of the former Piroplasms are not Sporozoa but Flagellata.

F. W. O'C.

FRANÇA (Carlos). Sur un Piroplasmide des Bovides de la Cote d'Or (*Achromaticus macfiei* n. sp).—*Anais. Sci. Med. do Porto* 1918. Vol 4. No 3 12 pp With 1 plate.

The author found the parasite in the blood of a sick cow Besides *P. bigeminum* and *Theileria mutans* the red blood cells contained parasites of various forms. rounded with central nucleus, rounded with peripheral nucleus and densely reticulated cytoplasm; rodlike forms occupying a whole diameter of the red cells with central or polar nucleus; pyriform, transversely placed with central nucleus, fusiform with round nucleus, sometimes curved; triangular with apical nucleus; amoeboid with multiple and irregular pseudopodia. A plate with coloured figures shows the great variety of forms

The parasite differs from Piroplasma by the central rounded nucleus and by the presence of true amoeboid forms. He considers the parasite to belong to the Plasmodia and to the genus *Achromaticus* described by GONDER. He suggests the name *Achromaticus macfiei* creating thus a third species of *Achromaticus*

F. W. O'C.

CHATTON (Edouard) & BLANC (Georges). Predilection du *Rhipicephalus sanguineus* pour le Gondi. Son rôle probable de vecteur de la toxoplasmose.—*Arch. Inst. Pasteur de Tunis*. 1918. Dec. Vol. 10 No. 4. pp. 281-282.

Reference is made to a previous publication by the authors in which they gave their reasons for believing that *Rhipicephalus sanguineus* acts as the invertebrate host of *Toxoplasma gondii*. They have since noticed that Gondis (Gerbilles kept in captivity) soon shake off their ectoparasites, on the other hand *Rhipicephalus* which infests the dog kennels of the Institute soon became attached to the rodents. *Toxoplasma* in dogs in the Institute has been reported.

F. W. O'C.

CHATTON (Edouard) & BLANC (Georges). Le *Leptomonas* de la Tarente dans un région indemne de Bouton d'orient Observations et Expériences.—*Bull. Soc. Path. Exot.* 1918. July. Vol. 11. No. 7. pp. 595-609.

A number of observations and experiments were made in Southern Tunis with reference to the endemicity and transmission of the parasite of Oriental sore. No definite cases of the disease was discovered during 1915, 1916 and 1917. The blood of *Tarentola mauritanica* was examined for *Leishmania* in 1093 cases with negative results. The blood of geckos was sown on NNN Medium at 25° in 43 cases with the following results:—

- 23 tubes remained sterile
- 7 tubes gave bacterial cultures
- 11 tubes showed cultures of *Leptomonas*.

In 1 tube *Crithidia* developed and in another *Trichomastix* with bacteria was found.

In January 1918 the heart blood of the gecko similarly sown gave negative results in 6 cases and *Leptomonas* in 6. In blood cultures of gecko blood made in July and August 1916 and February 1917 *Leptomonas* was not found but *Cnithidia* was recovered twice and *Trichomastix* once in 30 cases, *Leptomonas* was found in cultures from the lung, spleen and bone marrow. The authors were unable to find any relation between the *Leptomonas* and *Pyrrhemocytion tarentolae*. It is probable that the geckos are infected with *Leptomonas* throughout the year. Cultures have been kept alive for 11 months during which time 20 passages through NNN medium have been made without difficulty.

Intraperitoneal inoculations of *Leptomonas* cultures were made in 14 geckos experimented with. 50 per cent. became infected.

Of 20 geckos inoculated with *Leishmania* 11 died without evidence of flagellate infection; six showed flagellates. In five of these the parasite was of the *Leptomonas* type and in only one of the original *Leishmania* form. Cultures were made from these cases on the 14th day following inoculation. The *Leptomonas* type has been kept alive for three and four months and the *Leishmania* for 11 months. No change in type has been observed in either during this time. 16 mice were inoculated, 10 with *Leptomonas* and 6 with *Leishmania*, three became infected with the former and three with the latter. Ascitic fluid from these cases sown in NNN medium gave cultures of the original parasites in all cases. Monkeys inoculated with *Leptomonas* and *Leishmania* from geckos did not become infected. In bugs fed on infected geckos the writers found *Leptomonas* which showed no tendency to multiply.

Feeding experiments with *Phlebotomus minutus* and *P. papatasu* on infected geckos gave negative results.

The authors point out two facts: (1) The non-existence of *Leishmania* in the geckos in a region where Oriental sore is endemic; (2) The frequency with which geckos are infected with *Leptomonas*.

Other questions to be considered are, the existence in certain localities only of a reservoir for *Leishmania tropica*, and the aptitude of certain species of *Phlebotomus* only to act as carriers of the parasite of Oriental sore. The seasonal element is believed to be as important as the geographical one.

F. W. O'C.

HAUGHWOUT (F. G.). The Tissue Invasive Powers of Flagellated and Ciliated Protozoa with Especial Reference to *Trichomonas intestinalis*. A Critical Review.—*Philippine Jl. Sc.* Sec. B Trop. Med. 1918. Sept. Vol. 13. No. 5. pp 217-259. With 1 fig.

In a lengthy paper mainly concerned with reviews of the works of many well known authors the writer gives his opinion as to the pathogenicity of the flagellated and ciliated intestinal protozoa. He considers the case against *Trichomonas* established. While asserting that tissue invasion by *Trichomonas* has not been demonstrated he considers that he "may have passed it by" and that in the tissues these organisms may so resemble *Entamoeba* as to have been mistaken for the latter.

F. W. O'C.

PONSELLE (A). *Hexamitus intestinalis* Dujardin, parasite habituel de l'intestin des Batraciens, trouvé dans le sang de *Rana esculenta*—*C R. Soc. Biol.* 1919. Jan 11. Vol. 82. No 1. pp. 23-24
With 1 fig.

In the blood of *Rana esculenta* the author found a parasite under dark ground illumination which he identified as being the same as *Hexamitus intestinalis*. Blood from this animal was inoculated into the peritoneal cavity of two *Rana temporaria*. In both the parasites were subsequently found in the blood and in one of these there was a marked multiplication ten days after inoculation. An original infection of the blood by the same parasite was found in another *Rana esculenta*.

F. W. O'C.

NÈGRE (Léopold). *Recherches expérimentales sur l'évolution de la Sarcosporidie de la souris.*—*Thèses Doctorat. Sci. Nat. Paris* 1918 June. pp 89-116. 2e thèse [Summarized in *Bull Inst. Pasteur.* Vol 16 pp. 507-508.]

In his experiments the author used young mice weaned from the mother. They showed a little greater liability to infection with sarcosporidia than adults. From the time of appearance of the parasite in the muscle till full development, 40-50 days elapsed. At the end of 90 days the muscle was most infective. As the infection became older the chances of transmission diminished. The isolation of mice which had eaten infected muscle caused a distinct diminution in the number of infections. The abdominal muscles first became infected and then the other muscles, with the exception of the heart. Sporozoites did not keep well in water.

Experiments proved the existence of an infective stage in the faeces of mice infected with the muscle parasite. This appeared 15 days after ingestion of infected muscle and disappeared about the 75th day. The maximum power of infection was on the 50th day. Heating the faeces for 30 minutes at 60° did not inhibit infective power. It persisted but was reduced on heating for 15 minutes at 65°. It disappeared at temperatures of 85-90°.

F. W. O'C.

CHELLIAH (S.) *Rhinosporidium kinealyi.* *Jl Trop. Med. & Hyg.* 1918 Dec. 16 Vol. 21. No. 24 pp. 247-248. [From *Jl Ceylon Branch Brit Med Assoc.* 1918. June 15.]

This paper is concerned with three cases of infection with *Rhinosporidium* occurring in Ceylon. Two of the patients had never left the island and the author considers that the disease is indigenous there. The macroscopical and microscopical appearances of the growth in each of the cases are recorded.

F. W. O'C.

MACFIE (J. W. S.). *Two Parasites of Naja Nigricollis.*—*Ann. Trop. Med. & Parasit.* 1919. May 12. Vol. 13. No. 1. pp. 23-30.
With 1 plate.

In films stained with Leishman a scanty infection of trypanosomes was found. The parasitic was monomorphic and all specimens

observed were looped and had a well marked undulating membrane. The blepharoplast was some distance posterior to the nucleus and well anterior to the posterior end. The average measurements given are: length 50μ , breadth (excluding undulating membrane at nuclear level) 4μ . The parasite is shorter and narrower than *T. prumeti* which it somewhat resembles. The name *Trypanosoma voltariae* is suggested.

The other parasite observed was a plasmodium. This also was studied in films stained with Leishman. The infection was a large one. Asexual as well as sexual forms were found. Multiple infection of red cells by trophozoites was frequently noticed. The formation of more than two merozoites was not seen. As schizogony in the blood was not frequently found whereas infection of cells by trophozoites was common the author believes that schizogony possibly takes place in the organs. The gametocytes with the appearance of the male and female forms are described. The writer includes the parasite in the genus *Plasmodium* and considers it similar to *P. mesnili* Bouet.

F. W. O'C.

JONESCO-MIHAIESTI (C). *Technique de la coloration du sang et des Protozoaires, par le mélange panchromatique de bleu Eosine.*—*C. R. Soc. Biol.* 1918. Nov. 23. Vol. 81. No. 21. pp. 1090-1092.

Films for examinations may be fixed for two to three minutes in methyl alcohol or for five minutes in a solution of eosinate of methylene blue or eosinate of thionin. The methods for preparing the latter solution are described. After using the latter it is necessary to mordant with distilled water. The films are then placed in a bath containing panchromatic solution in the proportion of 3 drops of solution to 2 cc of neutral distilled water. They are left in the mixture for 20 minutes. After staining they are washed under the tap and then dried. To mount preparations neutral Canada balsam or cedar wood oil may be used.

F. W. O'C.

SHORTT (H. E.). *Note on Romanowsky Staining.*—*Indian Jl. Med. Res.* 1918. July. Vol. 6. No. 1. pp. 124-126.

By a modification of Borrel's method the author has produced stains from medicinally pure and also from ordinary unpurified methylene blue for which he claims good results.

1 gram of medicinally pure methylene blue is dissolved in 100 c.c. distilled water, the mixture is heated to near boiling point and occasionally shaken during the process; to the resulting solution is added silver oxide obtained by dissolving 0.5 gram silver nitrate in 50 cc. distilled water and precipitating with a 30 per cent. solution of caustic soda. In the latter process repeated washing with distilled water is necessary till the washing water is free from alkali.

With ordinary methylene blue the procedure is the same till the silver oxide and methylene blue solution are mixed. The mixture is then kept gently boiling and silver oxide is added in small successive stages, the flask being occasionally shaken till a faint purple colour develops.

The methods of employing and testing the stain are described.

F. W. O'C.

ENTERIC FEVER IN THE TROPICS

BASSETT-SMITH (P. W.). Typhoid and Antityphoid Record during the Fourth Year of the War.—*Jl. Roy. Nav. Med. Service.* 1919. Apl. Vol. 5 No. 2. pp. 150-151.

[For previous reports see this *Bulletin*, Vol. 9, p. 468 and Vol. 11, p. 456.]

This report by Surg.-Capt. BASSETT-SMITH, C.B., C.M.G., carries the work of antityphoid inoculations among the Naval forces from October 1st 1917 to September 30th, 1918.

Abstract of Returns which have been received.

Number of men inoculated.	One inoculation.	Two inoculations..
20,910	1,486	19,424

A "triple typhoid vaccine similar to that used in previous years" was employed.

During the period included in the report "the total number of cases of enteric was 96" —

	Typhoid.	Para "A."	Para "B"
Inoculated once	6	—	2
Inoculated twice	12	2	2
Not inoculated	61	4	7
	—	—	—
	79	6	11
	—	—	—
Deaths	Typhoid.	Para "A."	Para "B."
Inoculated once	1	—	—
Not inoculated	5	1	—
	—	—	—
	6	1	0
	—	—	—

"Of the twelve typhoid cases who had been inoculated twice, in nine of them over two years had elapsed since being last inoculated, but in one the period was only ten months, and this case was fatal. Of the two para "A" one had been inoculated six months before and one a little over a year. Of the two para "B," in both cases the inoculations had been given over two years previously."

[See references given in this *Bulletin*, Vol. 12.—BONEY, CROSSMAN & BOULENGER, p. 388; PEARSON, p. 392; MACADAM, p. 399.]

J. H. T. Walsh.

FRIEDBERGER (E.). Zur Frage der Typhus- und Cholereschutzimpfung I. Mitteilung. Ergibt sich auf Grund der bis jetzt vorliegenden authentischen Zahlen ein Erfolg der Impfungen gegen Typhus und Cholera im Krieg? [Evidence as to Results following Protective Inoculation against Typhoid and Cholera during the War?]
—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1919. Apl. 28. Vol. 28. No. 3-5. pp. 119-185. With 17 charts.

The bias of this paper and the arguments employed are partly understood when we learn that Herr Friedberger is an "anti-vaccinator" who ascribes belief in the efficacy of "vaccines" to

'a century of mute popular acceptance' of Jennerian vaccination! He states that one of the most remarkable performances in this war has been the victory of medicine over intestinal diseases. These favourable results have, the author tells us, been ascribed to two factors —

- (a) prophylactic inoculations
- (b) improved general sanitation, better personal hygiene with good food, good clothing etc.

He then compares the conditions under (b) with those present during former wars, and emphasizes the value of the second factor in controlling disease of the alimentary canal while, with the help of many statistical "tables" and charts, he endeavours to prove that prophylactic "vaccines" are of little, if any, value. He brings forward the accusation that "vaccines" themselves may do harm.

This may be admitted as possible but not probable with aseptic precautions and good technique. We must admit also that anti-typhoid inoculations do not absolutely protect against infection. Nevertheless readers of this *Bulletin* know that protective measures have been of inestimable benefit to the men of the armies of Britain, France and the United States of America. Those who cannot accept such evidence of the value of anti-enterica "vaccines" may turn to Herr Friedberger's paper.

As regards Cholera we know very little about the real protective "vaccines." Where men have been tested the bacteriolyins were found to disappear after 6-7 months [see this *Bulletin*, Vol. 10, p. 80].

[The writer of this notice was one of those who personally welcomed M. HAFFKINE to Calcutta in March, 1893 and watched him at work. He got little support from the Government or from the people and his work was not carried out under really favourable conditions. No evidence can be admitted unless large numbers are inoculated in places where they are likely to be exposed to infection. India is perhaps the best country in which results could be obtained. Thousands of pilgrims, for instance, pass through Orissa to the temple of Jagernath in Puri and cholera is endemic in the town and along the approaches by road and rail. A laboratory attached to the cholera Hospital at Puri could provide the necessary "vaccine," and the "Puri Lodging House Acts" gives the medical officer sufficient power to enforce registration of the pilgrims.]

J. H. T. W.

BAUMGAERTEL (Traugott). Ueber den Einfluss der Typhusschutzimpfung auf die Züchtbarkeit der Paratyphusbacillen aus Blut [Influence of Antityphoid Immunity on Culture Properties of Paratyphoid Bacilli from Patient's Blood.]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1. Teil. Orig. 1918 July 20. Vol. 27. No. 4. pp. 333-349. With 9 charts.

It is not easy to abridge this paper but the net results are:—From experiments with blood from 75 cases of paratyphoid A fever

and from 150 cases of infection due to *B. paratyphosus* B, the author concludes that —

“The power of development of the paratyphoid bacilli can be weakened by the alteration in the blood caused by protective anti-typhoid inoculation, so that for their demonstration a prolonged digestion of enriched blood-bile culture medium is necessary.”

This diminution in growth is the more evident, the shorter the time that has elapsed since the last injection of anti-typhoid vaccine. Charts are given showing effect on agglutination.

J. H. T. W.

GARDENGHI (G. F.). Osservazioni e ricerche intorno al bacillo paratifico B. [Researches concerning *B. paratyphosus* B.]—*Ann d'Igiene* 1918 Apr 30. Vol. 28. No. 4. pp 161–172

The author's work is based upon recent researches which have shown anomalous and atypical behaviour among bacilli which must be accepted as varieties of *B. paratyphosus* B. Using no less than 50 strains of varied origin, Professor Gardenghi has examined each one and tested cultural, biochemical and agglutination reactions. In a short summary he gathers up the threads of the detailed work. From the study of numerous strains procured from man and from animals it may be maintained that *B. paratyphosus* B (the bacillus of SALMON and SMITH) is distinguished by a group of differential characteristics, generally constant:— does not ferment lactose, does not coagulate milk, gives a parti-coloured reaction with litmus milk, first briefly acid, then alkaline (3rd day); does not produce indol. These characteristics are accepted by all bacteriologists and are only recorded as showing that, as regards the majority of strains, the author's work confirms that of other investigators.

As regards agglutination reactions each strain was tested against anti-paratyphoid B serum and with anti-serums for *B. paratyphosus* A, the bacilli of Gaertner, Voldagsen (*B. suispestifer*) and of Eberth.

Seven out of the 50 strains failed to give agglutination reaction with any of the test serums; one strain reacted with anti-Gaertner serum only, in dilution of 1 in 3,000. The author suggests that with such strains experiments as to virulence should be useful.

J. H. T. W.

BROUGHTON-ALCOCK (W.). An Atypical Strain of *B. paratyphosus* B. —*Lancet*. 1919. June 14. pp. 1023–1024.

Before bringing to notice an atypical variety of *B. paratyphosus* B. the author has, with wisdom and patience, made quite sure as to the evidence. Clinically and serologically this variety agrees with typical *B. paratyphosus* B. It differs from type in the following characteristics:—

- i. It is non-motile.
- ii. No gas or acid is produced in *dulcitate* peptone water when kept at 37°C., or at laboratory temperature, for two months.

"After subculturing on Witte's peptone broth agar during five years it has not altered in biological characters"

[Cf. Azzo (Azz) this *Bulletin*, Vol 10, p 295—Other references will be found in that "notice"]

J. H. T. W.

JORDAN (Edwin O). *Differentiation of the Paratyphoid-Enteritidis Group, IV. The Behaviour of B paratyphosus A and B. paratyphosus B in Milk.*—*Jl. Infect Dis* 1918 May. Vol. 22. No. 5. pp. 511-522.

(From the Department of Hygiene and Bacteriology of the University of Chicago.)

"It is now fairly definitely established that freshly isolated paratyphoid A strains slowly produce alkali in milk, and that alkali formation can always be observed when the incubation period is sufficiently prolonged. On the basis of these results it is manifestly incorrect to speak of 'permanent acidity' in litmus milk as a distinguishing characteristic of the paratyphoid A type. On the other hand, there is substantial agreement that the paratyphoid B strains produce alkali in milk noticeably earlier than the A strains. Gradations and variations in both types occur, especially in strains that have been for some time under artificial cultivation, but in general the distinction is fairly sharp. If a large series of strains be compared in litmus milk between the 4th and 8th days, it will be very rare indeed that the *B paratyphosus* A strains cannot be separated readily from *B. paratyphosus* B, *B. suipestifer* and *B. enteritidis*. In the course of examination of between 200 and 300 strains from many sources, I have found but one strain that could not be so distinguished. This was a paratyphoid B strain (No 221), typical in all other respects, which does not begin to show alkalinity until about the 10th day and so overlaps some of the more rapid alkali-producing A strains, as for example two or three kindly sent me by Dr Kiumwiedc"

Erlenmeyer flasks of 100 cc. capacity, containing 50 cc. fresh sterilized milk were used, and counts made on agar plates after the milk had been incubated at 37°C.

Table 1 will serve as an example of the method and results.

TABLE 1.

Counts taken in a Representative Series of Strains. Milk at 37°C.

	No. of Strain.	Initial Number Per cc.	After 3 Days	After 7 Days.
Para B strains ..	12	33,000	730,000,000	560,000,000
	185	26,000	355,000,000	320,000,000
	210	156,000	590,000,000	570,000,000
Suipestifer strains ..	63	94,000	391,000,000	160,000,000
	167	4,000	470,000,000	318,000,000
	234	589,000	630,000,000	270,000,000
Para A strains ..	4	34,000	30,000,000	108,000,000
	158	63,000	23,000,000	83,000,000
	188	12,000	37,000,000	120,000,000

"On the basis of a large number of counts . . . the statement seems warranted that within the first five days after inoculation of approximately equal numbers, the number of Para A bacilli in milk is less than one-half

or one-third and often less than one-tenth of the number of Para B bacilli. Connected with this is the fact that the numbers of Para A bacilli generally show an increase between the 3rd and 7th or 3rd and 10th day counts while the B strains show a decrease."

Tables are given showing that "Para A strains also appear to multiply in nutrient broth . . . more slowly than the Para B strains." [cf. TRILLET and FOUASSIER (*B. typhosus* in milk), this *Bulletin*, Vol. 8, p. 103]

J. H. T. W.

NÈGRE (L.). Sur la résistance différente au sel marin des groupes typhique, paratyphique A et paratyphique B, *B. coli*.—*C.R. Soc. Biol.* 1919. Apl. 12. Vol. 82. No. 11. pp. 387-388.

Dr. Nègre points out that KORBUTT published a "paper" on the influence of chloride of sodium on the vitality of microbes [*Zeit. f. Hyg.* 1912, p. 161] but that the paratyphoid group were not included in those investigations. Inoculated into agar containing 3 per cent. Na Cl the typhoid and paratyphoid bacilli thrive equally, and show an abundant growth at the end of 24 hours. The results with higher percentage of salt are shown in the following "Table".—

	Agar with 6% Na Cl	7% Na Cl.	8% Na Cl.	9% Na Cl.
Para. B group including: "Gartner," "Aertryck" and "Schottmüller." <i>B. coli-communis</i>	Abundant growth after 24 hours	Growth slow and feeble.	Traces of growth	No growth.
Typhoid bacillus and <i>B.</i> <i>paratyphosus</i> A.	Moderate growth only after 48 hours.	No growth.	No growth.	No growth.

In a "bouillon" medium the resistance to Na Cl is slightly increased.

J. H. T. W.

ALLIOTT (Henri). Contribution à l'étude de l'action antityphogène du jus de citron et du vin blanc.—*C.R. Soc. Biol.* 1919. May 10. Vol. 82. No. 13. pp. 457-459.

The author regrets that he has not been able to consult foreign literature and gives a brief sketch of previous investigations made by French biologists:—

In 1907 M. RIEGEL (*Bull. de l'Institut Pasteur*) found that a 0.6 per cent. solution of citric acid added to spring water destroyed *B. typhosus* in an hour and a half in summer sunlight. In winter the time required was two hours. M. Allott's experiments were made with lemon juice having an acidity of 41 to 42 gm. per litre (expressed as H_2SO_4). Tubes containing 10 cc. of this juice were incubated at 120° to destroy any moulds that might possibly be present. Grouped in series—3 in each group—these tubes then received one drop of a 24 hour culture of *B. typhosus* or of one of the paratyphoid bacilli. These tubes were well shaken and after 5, 10, 15, 20 and 30 minutes subcultures were made

from these in test-tubes containing 10 cc. of bouillon at laboratory temperature, about 30°C.

Experiments were also made with white wine. The results are given in the following "Table":—

	Minimum time required for death of Bacilli.		
	T	Para A	Para B.
Lemon Juice (average) ..	< 15 minutes	< 15 minutes	< 20 minutes
White Wine (") ..	< 10 "	< 10 "	< 15 "

J. H. T. W.

KOCH (Georg) & VON LIPPMANN (Richard). *Mischinfektionen von Malaria und typhösen Erkrankungen.* [Mixed Malaria and Enterica Infections.]—*Arch. f. Schiffs- u Trop.-Hyg.* 1919. Jan. Vol. 23. No. 2. pp. 21–36. With 8 charts.

Both authors worked in a sectoral field hospital in the Balkan area during the War. In that region malaria and enterica infections are endemic and where a double infection is present the case may be difficult to diagnose from clinical evidence alone. The authors recognise not only the masking effect which the symptoms of one disease may have over those of the other malady in average typical infections but also the difficulty in identifying the causative agent in certain forms of "typhoid" malaria. They point out that when laboratory aids to diagnosis are available differentiation can be accomplished in a few days. They describe in detail eight cases giving what may be called compound temperature charts. Two of these are reproduced, and are seen on the opposite page.

J. H. T. W.

NORRIS (Dorothy). *A Preliminary Note on the Preparation of Culture Media Suitable for the Growth of Organisms Used in Vaccines.*—*Indian Jl. Med. Res.* 1918. Oct. Vol. 6. No. 2. pp. 174–180.

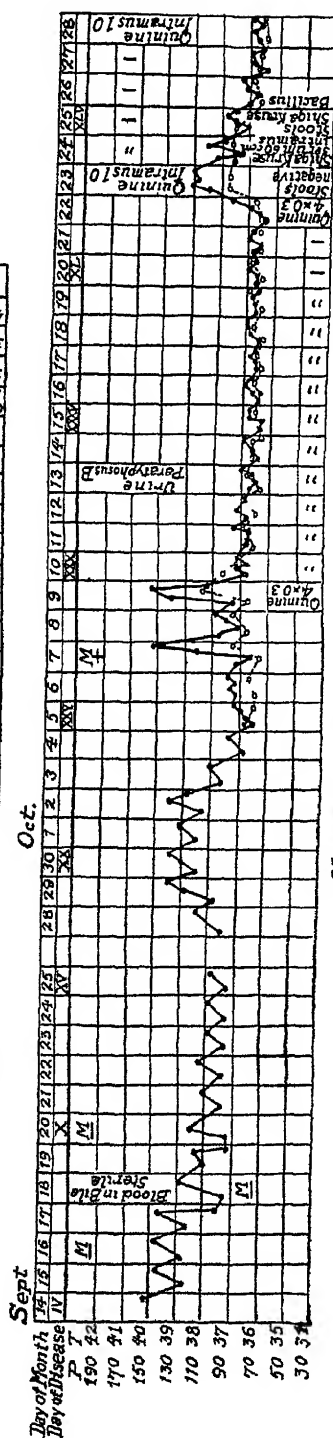
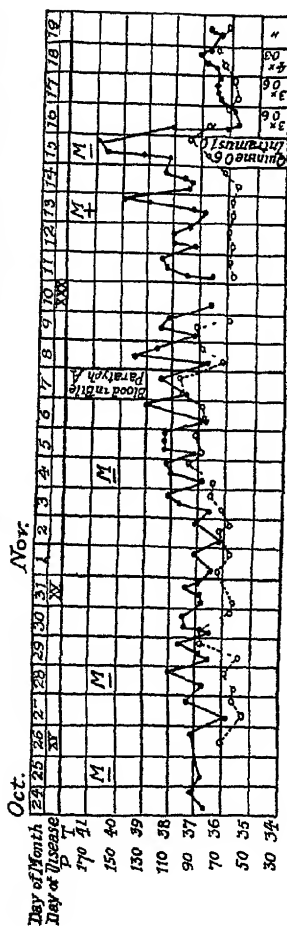
This series of experiments was carried out at the "Central Research Institute," Kasauli, Punjab. Thirteen useful 'tables,' summarizing the results obtained, are given. The chief conclusions are:—

The yield from "Beef Extract and powder peptone" was 5.34 (measured in 100 millions per sq. cm.); from tryptic hydrolysis of mutton 26.72 to 35.62.

The addition of comparatively small amount of hydrolysed nutrose to a poor medium increased the growing power to the level of an ordinary trypticized medium. Nutrose unless submitted to tryptic digestion is of little value. The same applies to "press cake from ground nut" (*Arachis hypogaea*) and casein which when hydrolysed give material equal in nutritive value to that obtained from meat. The trypsin was obtained from the pancreas of either sheep or goats. [These results are of value in relation to the use of vaccines among Hindus, Jains, and most Buddhists.]

KOCH (Georg) & VON LIPPMAHN (Richard).]

Temperature and Pulse Charts in Mixed Infections of Malaria and Enteric Fever.



M	+	-	Plasmodium present.	absent.
M	+	-		
M	-	+		
M	+	+		
M	-	-		

The continuous curve represents temperature (T.), the dotted curve represents pulse (P.).

- i. FERRANNINI (L.). Di una eccezionale complicanza cardiaca del paratifo.—*Giorn. di Med. Milit.* 1919. Apl. 1. Vol. 67 No. 4. pp. 501-504.
- ii. INOMOTO (M.). [Typhoid Abscess of the Testes in a Patient not suffering from Typhoid Fever. Case Report.]—*Jin Shimbun (Medical News)*. 1917. Dec. 25. No. 988. pp. 1701-1704. [From Review by Dr. R. G. MILLS.]
- iii. NICOLLE (M.), RAPHAEL (A.) & DEBAINS (E.). Etudes sur le bacille d'Eberth et les bacilles paratyphiques. (Quatrième Mémoire.) *Ann. Inst. Pasteur*. 1918. June. Vol. 32. No. 6. pp. 270-288.
- iv. MEDLAR (Edgar M.). Effect of Typhoid Lipovaccine in increasing Susceptibility to other Diseases. Animal Experimental Evidence.—*Jl. Amer. Med. Assoc.* 1918. Dec. 28. Vol. 71. No. 26. pp. 2146-2148.
- v. HAYES (R.). A Simplified Technique for Agglutination-Reactions (Widals)—*Indian Med. Gaz.* Dec. 1918. No. 12. Vol. 53. pp. 449-451. With 1 fig.

i. After an attack of paratyphoid fever the patients suffered from general oedema of limbs and face, grave palpitation of the heart, dyspnoea and nephritis with albumin and casts in the urine. Death occurred; no post mortem was allowed. [cf. for heart troubles after enteric fevers, MORRIS, this *Bulletin*, Vol. 12, p. 390.]

ii. There was no history of this patient ever having had the disease but his Widal was positive. A chill and slight fever accompanied the development of the suppurative orchitis which completely destroyed the organ.

iii. This investigation must be read by those interested in experimental work on animals. As for man it is accepted that epidemics of one or other type of enteric fever differ in virulence and that different strains of *Enterica* bacilli also differ in virulence as shown by the authors [cf. HOOKER, this *Bulletin*, Vol. 11, p. 446]

iv. In these experiments the author found that:—"There is no evidence that there is increased susceptibility to *Streptococcus* inoculation in mice following typhoid vaccination" with Lipo-vaccine

v. Differs only in detail from methods already described in this *Bulletin*, V. Index Vols 7-12

J. H. T. W.

YELLOW FEVER.

NOGUCHI (Hideyo). Etiology of Yellow Fever.

- i. Symptomatology and Pathological Findings of the Yellow Fever Prevalent in Guayaquil.—*Jl. Experim. Med.* 1919. June 1. Vol. 29. No. 6. pp 547-564 With 6 text-figs. & 4 plates
- ii. Transmission Experiments on Yellow Fever.—*Ibid.* pp. 565-584. With 3 text-figs. & 1 plate.
- iii. Symptomatology and Pathological Findings in Animals Experimentally Infected.—*Ibid.* pp. 585-596. With 3 text-figs. & 3 plates.
- iv. The Acquired Immunity of Guinea Pigs against *Leptospira icteroides* after the Inoculation of Blood of Yellow Fever Patients.—*Ibid.* 1919. July 1. Vol. 30. No. 1. pp. 1-8.
- v. Properties of Blood Serum of Yellow Fever Patients in Relation to *Leptospira icteroides*.—*Ibid.* pp. 9-12.
- vi. Cultivation, Morphology, Virulence, and Biological Properties of *Leptospira icteroides*.—*Ibid.* pp. 14-30. With 3 plates.

The articles here summarized constitute an amplification of a previous paper [this *Bulletin*, Vol 13, p. 250]. All are profusely illustrated.

i. A detailed description of the clinical and pathological features of yellow fever in Guayaquil based on an investigation of 172 cases. The description conforms with the observations of other investigators of the disease as it has occurred elsewhere.

ii. Transmission experiments, the main conclusions respecting which have already been published (*loc. cit.*), are described in detail.

As originally stated, positive results were obtained in guinea pigs by injection of the blood from 6 out of 27 cases of yellow fever. It is now recorded that in 21 instances there "was either a temporary febrile reaction in the guinea pigs after inoculation of the blood with or without any suspicion of jaundice, or almost no reaction at all. In other words, the results are classed as indefinite or negative. It is noteworthy, however, that a considerable proportion of the guinea pigs inoculated with the blood drawn during the first five days of the disease had a febrile reaction either on the 4th, 5th, 6th, or 7th days and in some of these animals even a trace of jaundice was noted or suspected for a day or two soon after the fever. . . . Some of these animals must have had a mild or abortive form of the infection as they subsequently proved to be refractory to a virulent virus when tested after a period of about 25 days from the time of the inoculation of the yellow fever blood."

The following is the author's summary of his experiments:—

"By injecting into guinea pigs the blood of yellow fever cases occurring in Guayaquil a group of symptoms and lesions closely resembling those observed in human yellow fever were induced in a limited number of instances. Of 74 guinea pigs inoculated with specimens of blood from 27 cases of yellow fever 8, representing 6 cases, came down with the symptoms namely, a marked rise of temperature after a period of incubation averaging 3 to 6 days, with simultaneous suffusion of the capillaries, particularly of the conjunctivae and soles, then preliminary hyperleucocytosis followed by progressive leucopenia, the early appearance of albumin and casts in the urine, which gradually diminishes in volume as the disease progresses. The fever lasts only a few days, rapidly dropping first to the normal and then usually to subnormal. At this period jaundice manifests

itself in varying degrees of intensity, first in the sclerae, then in the skin and the urine. Hemorrhages from the nasal or gingival mucosa or anus have been observed to occur during this period. Autopsies reveal deep jaundice throughout the entire tissue. The liver is fatty and yellow, the kidney hyperemic, and often swollen and hemorrhagic. Hemorrhagic spots were almost always found in the lungs and gastrointestinal mucosae. Guinea pigs are usually rather sensitive to the injection, though many appeared to be somewhat resistant and some even refractory.

The injection of the yellow fever blood into ringtail monkeys, rabbits, cats, guatusas, weasels, and sloths among the mammals, and pigeons, ground-doves, bluebirds, mantas, blackbirds, parakeets, reedbirds, blancos, and toucans among the birds, gave negative results.

In the blood, liver, and kidneys of the guinea pigs experimentally infected with the blood of yellow fever patients a minute organism was demonstrated which closely resembles in morphology the causative agent of infectious jaundice (*Leptospira icterohaemorrhagiae*).

The leptospira transmitted from yellow fever cases to guinea pigs was found to induce similar symptoms and lesions upon further passage into normal guinea pigs.

The leptospira obtained from cases of yellow fever has been given the provisional name of *Leptospira icteroides*.

iii. It was found that infection could be induced by injection into the peritoneal cavity, the blood circulation, or subcutaneously, or by application to the scarified depilated skin, or to the mucous membranes or by feeding with infected tissue or culture.

The following is the author's summary of his experiments :-

Studies are reported on the type of disease induced in guinea pigs, dogs, and monkeys by inoculating them (1) with the blood or organ emulsions of guinea pigs or other susceptible animals experimentally infected with *Leptospira icteroides*, and (2) with a pure culture of the organism. Particular attention has been given in these experiments to the clinical features of the experimental infection in the various animals and to the pathological changes resulting from the infection.

The symptoms and pathological lesions induced in guinea pigs are much more pronounced than those observed in dogs or marmosets. The period of incubation is nearly the same in all three species, 72 to 96 hours with intraperitoneal or subcutaneous inoculation, and a day or more longer when the infection is induced percutaneously or *per os*. The febrile reaction in the guinea pig and marmoset is about the same; in the dog there is less fever. The amount of albumin, casts, and bile pigments in the urine is more abundant in the guinea pig and marmoset than in the dog, and these animals also appear on the whole to become more intensely icteric. The black or bilious vomit however though occurring frequently in dogs during life, is observed in the guinea pig and marmoset at autopsy. The hemorrhagic diathesis is most pronounced in guinea pigs, less so in marmosets, and least in dogs. In dogs, for example, subcutaneous hemorrhages almost never occur, and the lungs usually show only a few minute ecchymoses. The pleurae pericardium, and other serous surfaces of the thorax and abdomen remain free from ecchymoses which, however, with hyperemia, are very marked along the gastro-intestinal tract.

The symptoms and lesions observed in animals experimentally infected with *Leptospira icteroides* closely parallel those of human yellow fever.

The pathological changes occurring in human cases of yellow fever are similar to those induced by inoculation in guinea pigs and marmosets and in respect to their intensity stand intermediate between those arising in the two animals mentioned.

iv. Details are given of the result of reinoculating a number of guinea-pigs with a virulent strain of *Leptospira icteroides*, 25 days after having withstood inoculation with the blood of yellow fever patients.

It should be emphasized that for the purpose of transmission, cases were selected which were still in the early stage of the disease, previous

investigators having pointed out the fact that the virus may no longer exist in the peripheral blood after the 3rd day of the illness "

The main conclusions arrived at are those already set out under ii. (above).

v. The following is the author's summary of his experiments :—

" The serum from a number of persons recovering from yellow fever in Guayaquil was studied with a view to establishing its possible immunological relationship with a strain of *Leptospira icteroides* derived from one of the yellow fever patients. For this purpose the serum of convalescents was mixed either with an organ emulsion of a passage strain, or with a culture of the organism, and inoculated intraperitoneally into guinea pigs.

" The Pfeiffer reaction was first studied, and then the animals were allowed to live until the controls, inoculated with the same emulsion or culture of *Leptospira icteroides* but without the serum or with serum from patients suffering from other diseases than yellow fever, had died of the experimental infection with typical symptoms. A positive Pfeiffer phenomenon was observed in fifteen of the eighteen convalescent cases studied, or approximately 83 per cent. Sera from ten non-immune soldiers and from two malaria patients gave uniformly negative results. Protection from an ultimate fatal infection was afforded some of the guinea pigs which received the serum of yellow fever convalescents, while the control animals succumbed to the infection with typical symptoms. In one instance, in which the serum was tested on the 2nd and the 10th days of disease, a Pfeiffer reaction was demonstrated, as well as protective property against the infection, in the specimen from the 10th but not in that from the 2nd day.

" From the foregoing observations of immunity reactions it appears highly probable that *Leptospira icteroides* is etiologically related to yellow fever.

vi. The methods recommended for cultivation are on the same lines as those employed by the author for the organism of infective jaundice [this *Bulletin*, Vol. 11, p. 205 and Vol 12, p. 225]. For the precise composition of the media the original paper must be consulted.

" On three occasions, that is, from three out of eleven cases of yellow fever the organism was directly cultivated. These three strains were found to induce the characteristic symptoms and lesions when tested on guinea-pigs. The organism was designated *Leptospira icteroides*.

" *Leptospira icteroides* was also obtained in pure culture from the blood of guinea-pigs which succumbed to infection after being inoculated with the blood or organ emulsions from patients suffering from yellow fever. These cultures also proved to be virulent when tested on susceptible animals "

The organism 'grows best when the supply of oxygen is not excessive as when a thin layer of liquid paraffin is poured over the surface of the culture medium.' It does not multiply under anaerobic conditions. "The presence of blood serum (man, sheep horse, rabbit &c.) seems to be essential for its growth. It grows well at a temperature of about 25-26°C. and more quickly at 33°C." It multiplies by transverse division. The organism is thus described... "an extremely delicate filament measuring about 4 to 9 microns in length and 0.2 of a micron in width along the middle portion. It tapers gradually toward the extremities which end in immeasurably thin sharp points. The entire filament is not smooth, but is minutely wound at short and regular intervals, the length of each section measuring about 0.25 of a micron. The windings are so placed as to form a zigzag line by the alternate change of direction of each consecutive portion at an angle of 90°."

It is somewhat smaller than the various strains of *Leptospira icterohaemorrhagiae* in the author's possession. It is actively motile and is difficult to stain "but can be made distinct by osmic acid fixation and one of the Romanowsky stains. . . . When stained with Fontana or carbolized gentian violet solution after mordanting with 5 per cent. tannin plus 1 per cent phenol the organism appears as a moderately heavy, slightly undulated filament without a clear elementary indentation."

"The virulence obtained by some strains was such that 0.00001 c.c. of a culture could induce typical fatal infection in guinea-pigs. There exists a considerable variation among guinea-pigs in their susceptibility to *Leptospira icteroides*."

"The organism is killed within 10 minutes at a temperature of 55° C. and is also destroyed by complete desiccation or freezing and thawing. Bile and bile salts dissolve it in certain concentrations, but not saponin. . . . it is readily killed within 5 minutes by 2 per cent. phenol or 0.1 per cent bichloride of mercury."

Attempts to infect the larvae of *Stegomyia calopus* by means of emulsions of infected liver and kidney were unsuccessful.

The organism rapidly disappears after the death of the host—much more quickly than *Leptospira icterohaemorrhagiae*, the latter being recoverable from animals kept overnight after death.

The possibility of the existence of a granular phase in the life of *Leptospira icteroides* is suggested by the observation that a number of culture tubes which had contained abundant organisms showed, after an interval, only the presence of large numbers of refringent granules. Guinea-pigs inoculated with this material developed typical symptoms and spiral forms of the organism were found in the tissues and cultivated. "It is of course possible that these old culture tubes contained the spiral leptospira in such small numbers that they escaped microscopic detection, but it is also possible that they existed in a granular phase under certain conditions"

E. J. W.,

ARCE (J.). Sobre las recientes investigaciones de Noguchi acerca del agente específico de la fiebre amarilla. [The Recent Investigations of Noguchi concerning the Specific Cause of Yellow Fever]—*Ann. Facul. de Med. de Lima* 1919 Feb Vol. 2 No. 7. pp. 53-61.

A clear account of NOGUCHI's work on the *Leptospira* found by him in the blood of yellow fever patients in Guayaquil and also in the blood, liver and kidneys of guinea-pigs inoculated with blood from yellow fever patients. While admitting that it is highly probable that the *Leptospira* isolated by NOGUCHI is the true specific causal agent in yellow fever, the author points out that two links in the chain of proof are still wanting: (1) the production of yellow fever in man by inoculation of pure cultures of the organism and, (2) the demonstration of an evolutionary cycle of the *Leptospira* within the mosquito up to its re-implantation in a vertebrate host. "Proof," says the author, "of the specificity of the *Leptospira* found by Noguchi would, among other notable benefits, permit of rapid and sure diagnosis in those benign cases of yellow fever, whether in the child or the adult,

which are at present so difficult of diagnosis and, either passing unnoticed or being confounded with other pyrexias, escape the prophylactic measures aimed at the extinction of the scourge. This single fact is sufficient proof of the great importance for our country, constantly menaced by the endemic focus Guayaquil, of the research initiated by Noguchi with such high promise."

F. S. A.

TAVARES (Armando Sampaio). *A resistencia globular na febre amarella.*—*Brazil Medico*. 1918. Dec. 7. Vol. 32. No. 49. pp. 385-388.

A discussion of the essential causation of the icterus of yellow fever. The author maintains, in opposition to the view of Couto and Sodre, according to which the icteric tint is due to the decomposing action of the yellow fever toxin on haemoglobin diffused through the blood plasma, that it is, on the contrary, due to a haemolysmic action of the toxin on the lipoids of the limiting membrane of the corpuscles.

F. S. A.

TROPICAL DISEASES OF THE SKIN.

CICERO (R. E.) [Treatment of Parasitic Diseases of the Scalp]—*Rev. Med. Pueblo, Mexico*. 1919 Mch. Vol 1. No. 8. p. 177.
[Summarised in *Jl Amer. Med Assoc.* 1919. May 31. p. 1650.]

A record of 354 cases of defluvium capillorum produced by the administration of thallium acetate in cases where X rays were unprocurable.

E. G. Graham Little.

LAWRENCE (R. D.). Febrile Urticaria.—*Brit. Med. Jl* 1919 June 7. p 701 With 2 charts.

Two cases, occurring in the same hospital within five days of each other, are reported. Both showed urticarial swellings with large wheals, and five days pyrexia. Infectivity is suggested but no data in evidence are given.

E. G. G. L.

LAIN (Everett S.). Dermatitis *Lycopersium Esculentum* (Tomato Plant).—*Jl. Amer Med Assoc.* 1918. Oct. 5 Vol. 71. No. 14. pp 1114-1116. With 1 fig.

Two cases of dermatitis attributed to handling tomato-plants are reported, with a fair degree of probability that the attribution was justified

E. G. G. L.

LE ROY DES BARRES & HUTEAU. Un cas de Dermatite polymorphe.—*Bull Soc. Méd-Chirurg Indochine* 1918 Dec Vol 9 No. 2. pp 56-58.

The patient was an Annamite native man aged 55. The eruption was of acute onset and typical of dermatitis herpetiformis of DUBRING ; dermatite polymorphe of BROCC.

E. G. G. L.

SEMON (H. C.) & BARBER (H. W.) Pyodermia of Parasitic Origin.—*Jl. Roy. Army. Med. Corps.* 1919. May. Vol. 32. No. 5. pp. 388-400 With 9 figs.

Pyodermia in Army practice is most commonly associated with scabies, seborrhoeic diathesis (for in this view the authors support DARTER) and pediculosis. When confined to or occurring upon the face, scalp and neck, seborrhea is probably the cause. This may be associated with scabies as well. Pediculosis is usually due to the body louse, and is far more severe than in civil practice. The authors make the important observation that the nits of this parasite are "usually" to be found attached to the pubic and perineal hairs, less commonly to the axillary hair. Removal of these is essential to cure. The authors proved their point by hatching out pediculi vestimentorum from nits derived from pubic hair. The bite of the parasite seems to cause an immediate superficial pustule in situ, which in untreated cases may develop into a deep seated boil, or if scratched, into a

near impetiginous ulcer which heals leaving pigmentation or scar. Treatment of pediculosis should always include destruction or removal of nits on the body as well as disinfection of clothes. The importance of these parasitic diseases in the Army is illustrated by the statement that out of 669 cases admitted into a hospital 631 were classed as pyodermias: 442 of these were due to scabies and pediculosis, and of these again 257 were attributable to pediculosis

E. G. G. L.

GROS (H.). L'ulcération saisonnière récidivante des lèvres.—*Bull. Soc. Path. Exot.* 1919. May 14. Vol. 12. No. 5. pp. 214-217.

The author found in film preparations from the exudate of the superficial ulcer a diplobacillus, which stained well with aniline dyes and was non-Gram-retaining. No cultures or inoculations were made.

E. G. G. L.

McMURRAY (W.) & STOKES (F. O.) Phagedaenic Ulcer of Warm Climates.—*Med. J. Australia* 1919 Feb 1 pp. 87-89

A summary of nine cases seen in Australia, two are described in detail. In both of these *Spirochaeta Schaudinni* was demonstrated, in one the Wassermann test was positive, and improvement was obtained with arsenobenzol.

E. G. G. L.

WEIDMAN (Fred D.) Pemphigus in an Orang-Utan infested with *Strongyloides (Intestinalis?)* and dying from Advanced Tuberculosis.—*Jl. Cutan. Dis.* 1919. Mch. Vol. 37. No. 3. Whole No. 436 pp. 169-173. With 3 figs.

The diagnosis of pemphigus was made by a competent dermatologist and confirmed, as far as their finding is confirmation, by increase of eosinophile corpuscles in the serum obtained from the bleb. The association with *Strongyloides* and tuberculosis was doubtless accidental

E. G. G. L.

CHALMERS (Albert J.) & INNES (Arthur). Sudanese Examples of Two Common Hyperkeratoses. (II) *Pityriasis Rubra Pilaris*.—*Jl. Trop. Med. & Hyg.* 1919. June 2. Vol. 22. No. 11. pp. 97-106. With 4 plates.

It is difficult to justify the implication in the title that pityriasis rubra pilaris is a common hyperkeratosis, for in point of fact it remains for dermatologists throughout the world a rare disease. A great part of this careful paper is a laborious restatement of controversies which most dermatologists would regard as settled. The most valuable part of the paper is an admirable report of a case of this disease in a Sudanese native man and the authors claim this to be the first case to be reported as occurring in the tropics. The description of the case, which is most excellently illustrated by photographs, is that of a typical example of the disease. There is much less to be said for the inference that the disease is a tuberculide. This conclusion seems to

be based on the observation of a certain histological conformation which "points to a toxic agent," and it is claimed that "the presence of giant cells and a certain cellular formation suggest" that the toxin is that of tubercle. The evidence is clearly insufficient to carry the conclusion and no other evidence is offered.

E. G. G. L.

JOUVREAU-DUBREUIL (H.). Un cas de Kératodermie symétrique des extrémités chez un enfant chinois.—*Bull. Soc. Méd. Chirurg. Indochine*. 1918. Dec Vol. 9 No 2 pp. 64-67.

The keratoderma was especially marked on the soles of both feet, to a much less degree on the hands; there was a small patch on the back over the coccyx. The eruption had appeared during convalescence from small-pox at the age of 8. No fungus was found and the causation was not ascertained.

E. G. G. L.

ROBERT (L.). Deux cas de chéloïdes géantes du bras et du tronc. Un cas de Molluscum fibrosum géant de la face.—*Bull. Soc. Path. Exot.* 1919. Apl. 9. Vol. 12. No. 4. pp. 188-191. With 4 figs.

In the first case cheloids developed in the site of an old ulceration of character undetermined by bacteriological examination. In the second case the cheloid developed in the site of ordinary vaccination; here also bacteriological tests shewed no specific organism. In the third cases a molluscum fibrosum tumour developing soon after birth grew in 32 years into a swelling covering the whole face. All the patients were natives.

E. G. G. L.

MONTPELLIER (Jean). Les tumeurs malignes de la peau chez les indigènes de l'Algérie.—*Bull. Soc. Path. Exot.* 1919. Apl. 9. Vol. 12. No. 4. pp. 184-188.

The author combats effectively by statistics observed in a single department during 20 years, the impression that epithelioma is less common in natives than in Europeans, and he also controverts the view that sarcoma is especially common in natives, as has been affirmed; it is in fact much more rare than epithelioma.

E. G. G. L.

BUCHANAN (R. E.). Favus Herpeticus or Mouse Favus. Possibility of Production of Favus in Man from Australian Wheat.—*Jl. Amer. Med. Assoc.* 1919. Jan. 11. Vol. 72. No. 2. pp. 97-100.

This is a careful resumé of the literature of mouse favus, and a report after examination of wheat imported from Australia into the United States from a district in which the wheat was known to have been contaminated by mouse favus, as described by LAWRENCE and PAUL. Buchanan found remains of mice in the wheat but no evidence of active fungus.

E. G. G. L.

LAWRENCE (Herman). **Dermato-Mycosis in Mice and Men.**—*Med. Jl Australia*. 1918. Feb. 23. Vol. 1. 5th Year. No. 8. pp 146-149. With 1 plate.

A well illustrated paper reproducing the clinical appearances in mice and on the arm of a human being; the picture and description of the culture render its identification with *Achorion Quinckeum* highly probable.

E. G. G. L.

CHALMERS (Albert J.) & MARSHALL (Alexander). **Trichophyton Currl.**—*Jl. Trop. Med. & Hyg.* 1919. May 1. pp. 83-84. With 1 fig.

The fungus here described was an endothrix from the scalp of a native boy aged 7 years. Cultures on Sabouraud media seemed to identify it with a trichophyton isolated by the authors in 1914 and reported in the *Jl. Trop. Med. and Hyg.* Sept. 1, 1914.

E. G. G. L.

DOLD (Hermann). **Eczematoid Epidermophyton Infection in China.**—*China Med Jl* 1919. Mch. Vol. 23. No. 2. pp. 133-138.

An infection of the feet locally known as Hong Kong Foot is described by Dold and attributed to the presence of epidermophyton. Of 98 cases examined 81 were men, an incidence which agrees with European experience, as also does the comparative immunity of early childhood, for no instance was met with under the age of eleven years. In 95 of the series the fungus was demonstrated. In 94 cases the disease was confined to the feet. Recurrence in summer, and mitigation or cure in winter are usually met with. In fourteen cases fungus was cultivated, the growth being "similar" to that of the epidermophyton of Sabouraud. In two cases the author succeeded in reproducing the disease, in a Chinese native and in his own person, by keeping sterile gauze, soaked in an emulsion of a culture, in contact for several days with the skin of the toes. The same fungus was again obtained from the experimental cases.

E. G. G. L.

MISCELLANEOUS.

TAYLOR (Herbert D.). Effect of Exposure to the Sun on the Circulating Lymphocytes in Man.—*Jl. Experim. Med.* 1919. Jan. Vol. 29. No. 1. pp. 41-52.

"Chronic solar dermatitis was accompanied, in 25 of the 38 individuals studied, by an appreciable increase, percentage and absolute, in the number of circulating lymphocytes

"In eight there was a definite decrease and in five no appreciable change after prolonged exposure to the rays of the summer sun [in New York].

"Of the thirteen subjects with no increase in blood lymphocytes, six failed to tan, three were so dark originally that to determine an increase was impossible, and five had an extremely high lymphocyte count at the first count.

"Blood counts on white persons living in the Philippines indicate that the blood lymphocytes are likewise increased after a prolonged period of residence in the tropical zone.

"Because of the parallelism between the tanning and the blood changes it seems probable that the lymphocytosis observed in the majority of instances, which is similar to the response of the blood of animals to small doses of the N-rays, is due to the effects of the ultra-violet rays contained in the solar spectrum."

A. G. B.

ROCKEFELLER FOUNDATION ANNUAL REPORT. 1917 379 pp. With 55 figs 1917. New York: The Rockefeller Foundation, 61 Broadway.

The bulk of this Report, which covers the calendar year of 1917, is devoted to work on the control of hookworm disease; infection surveys were conducted in Tobago, Cayman Islands and Papua and demonstrations in the relief and cure of the disease were carried on in 22 foreign states and countries as well as in the U.S.A. A preliminary infection survey was made of a colliery in Kiangsi, China.

The Board has recently turned its attention to malaria and in 1916 and this year conducted control measures at three different places. In a rural community in Arkansas every occupied house was screened with galvanised wire cloth and no other measure was employed. In December there was a great reduction in the parasite index of May, but the index of the following May could not be obtained. However the people, "mainly typical plantation negroes," were thoroughly convinced of the value of the screens. With the life of the screen estimated at 2 years the per capita cost was \$1.75. In another rural community in the same neighbourhood prophylactic quinine was tried as the sole measure. All persons (children on a lesser scale) received five grains morning and evening on two successive days in each week. The parasite index was much less in December than in May but a second May record was not obtained. The per capita cost was 57 cents. In a lumber town of 2,029 inhabitants such anti-mosquito measures were employed "as would be within the limits of expenditure which such a community might well afford." The measures are detailed. The results are exhibited in a chart showing the "calls" for malaria in 1915 (estimated), 1916, and 1917. They appear very striking. "At \$2.00 per physician's call this community has been paying, annually, almost four times as much in doctors' bills alone

for the privilege of having malaria as it has expended during the current year to be practically free from malaria and from the mosquito as a pest." At the end of the year the community took over the work. The per capita cost was \$1.24 for the first year and '63 for the second. Similar results were obtained in another place.

In 1916 the Board appointed a Yellow Fever Commission with General GORGAS at its head. This commission visited parts of South America in which the disease was reported or suspected but later its operations were suspended. A member of the Commission found 8 cases at Coro (Venezuela, east of the Gulf of Maracaibo).

A Department of Hygiene was established at Sao Paulo, Brazil. Dr. S. T. DARLING has been appointed Director. After five years the Brazilian Government will assume its support.

The Board has equipped a hospital ship for the Sulu Archipelago, Philippine Islands, "for the purpose of demonstrating the value of a mobile dispensary service operating from a base hospital." It has a ward with ten beds and carries a doctor and nurses. It is to cruise among the islands establishing relations with the inhabitants.

The Report is effectively illustrated

A. G. B.

KÜLZ (L.) *Kriegsärztliche Beobachtungen aus Rumänien; insbesondere über Klinik und Aetiologie der Pellagra*. [Observations from Rumania by a Military Surgeon especially on the Symptoms and Aetiology of Pellagra.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1918. Dec. Vol. 22. No. 22/23. pp 401-130

The author was on military duty in Rumania for more than a year and saw at his clinic monthly more than 2,000 Rumanian patients. He describes discursively some of the chief diseases of the country, in particular typhus, malaria and dysentery; the last named is exclusively bacillary and mild in character. Of most interest are his observations on pellagra, for which the yearly morbidity figure in peace time is over 70,000. In Rumania the place of potatoes and of bread is taken, in large measure, by maize, which is cooked to form a sort of pudding. A normal adult will eat 700 gm. of maize meal a day. The Germans ate bread containing 20 per cent. of maize, but none suffered except the author himself. His illness began with digestive troubles. Later he had oedema of the feet, gradually extending upwards to the knees which became filled with fluid. The oedema at first disappeared after the night's rest, but afterwards became constant. Distressing pains in the muscles followed. A sudden change in the oedematous regions then occurred; the skin became red like a recent sun-burn, especially on the extensor surfaces. It was then that a diagnosis of pellagra was made. A few days later the area became eczematous, at first dry then wet, small ulcers forming. The general condition remained good but much weight was lost. The author was owing to his disability invalided to Germany, where he made a recovery in three weeks, complete but for a tendency to branny desquamation of the previously affected skin, and chocolate brown pigmentation. On his return to duty he at first avoided maize, but later partook of the army bread, with the result that in a few days slight oedema appeared, quickly to disappear when the bread was no longer eaten. Indeed on several occasions the bread was tried but every time the

symptoms recurred. He remarks that the maize used was of the best quality. The symptoms which he describes are not the usual pellagrous symptoms but afterwards he often recognized them in Rumanian patients. They resist all therapeutic measures but yield at once to the cessation of maize consumption. If maize continues to be eaten the severer forms develop.

A. G. B.

CHATTON (Edouard). *Le Laboratoire militaire de Bactériologie du Sud-Tunisien (à Gabés). Organisation. Rendement du 1er août 1916 au 1er juillet 1918.*—*Arch Inst Pasteur de Tunis*. 1918. Dec. Vol 10 No 4 pp. 199-242

The military bacteriological laboratory at Gabés, South Tunis came into existence in August 1916 and was in full working order five months later. A detailed account of the original work done and tables of the routine examinations are here submitted. The work is analysed under the headings—Intestinal flora and fauna; blood flora and fauna; cephalospinal flora and fauna; conjunctival flora; flora and fauna of the skin; Bouton d'Orient and guinea-worm; toxoplasmosis; and water examinations. A table giving the results of 478 positive analyses of stools shows that in 53 cases of bacillary dysentery *B. Shiga* was recognised 55 times and *B. Flexner* twice; *Entamoeba dysenteriae* in vegetative form 140 and in cystic or precystic form 72 times in 73 patients. The flagellates of the large intestine (*Blastocystis*, *Trichomonas*, *Chilomastix*) were rare in bacillary dysentery, common in cutamoebic dysentery. Both forms of dysentery predominate in the autumn, a circumstance which the author attributes to the autumnal multiplication of flies which take refuge from the rain in human habitations.

Those parts of the Report which deal with the entamoebae, infection of guinea pigs, researches on intestinal flagellates, etc. have been already summarised in this *Bulletin*. In the case of the enteric fevers haemoculture was successful in 22 out of 27 cases. The researches on the aetiology of cutaneous leishmaniasis are described in some detail. Doubtful points would have been cleared up but for the war.

A. G. B.

YOUNG (W. A.). *Common Diseases seen in British Hospitals as seen in Sierra Leone.*—*Jl. Trop. Med. & Hyg.* 1919. Jan. 15. Vol. 22. No. 2. pp. 9-14.

A paper by the M.O. in charge of the Colonial Hospital Laboratory, Freetown. The diseases are those met with in temperate climates as seen in the indigenous population of Freetown, which has about 84,000 inhabitants.

Acute bronchitis is common both of itself and as a symptom of malaria, especially in children. *Pneumonia* accounts for 6 per cent. of the deaths in one year; it is fatal in 30 to 50 per cent. of cases, often accounting for sudden death. *Pleurisy* is equally common, some cases being tubercular; "pleural effusions, the result of anaemia and heart trouble, are quite common." *Tuberculosis*.—"The chronic forms, such as tubercular knee, caries of the spine, tubercular glands of the

neck, etc., are rarely seen, also one does not find post-mortem signs of healed tubercular lung. The usual type is phthisis pulmonalis, which is quickly fatal. There would appear to be little or no immunity. Inhalation seems to be the only source of infection, because no milk other than tinned is consumed, and tuberculous cattle, allowing they do cause a small percentage of infection, are very rarely seen; 5 per cent. of all deaths are attributed to phthisis pulmonalis. There are no records of tubercular meningitis. *Rheumatic fever* is not met with in natives who have never left Sierra Leone. Damage to mitral valves is rarely seen at autopsy. *Myocarditis* is common and "undoubtedly the cause of the numerous cases of dilatation and mitral incompetence" seen. "The chief causes would appear to be ankylostomiasis acting directly by its toxin, and indirectly by the anaemia caused, ascaris and its toxins (possibly), syphilis and gonorrhoea." Permanent mitral incompetence is a common occurrence in the Sierra Leone native, attributed to the joint effects of myocarditis and head carriage of heavy loads. *Tachycardia*, which is common, is tentatively attributed to, in some instances, gonorrhoeal neuritis of the vagus. *Aortic valve lesions*, when met with, "are due to the gonococcus" or syphilis. *Arteriosclerosis* is prevalent. *Smallpox*, *mumps*, *chicken-pox*, *measles* and *hooping cough* are all met with.

Of *typhoid* there have been 5 cases detected in 6 years. *Diphtheria* is not known. Seven out of ten natives show *dental caries*; *stomatitis* is common. "About 3 to 5 in every hundred males" have *inguinal hernia*, "the consensus of opinion is that for one left there are nine cases of right inguinal hernia" [cf HOWARD, this *Bulletin*, Vol. 12, p. 136]. *Umbilical hernia* is common; it is an ill wind that blows nobody any good for "through this hernia one may easily palpate organs, such as the spleen, and much information can be obtained in this manner." *Appendicitis* has not yet been demonstrated; in post mortem work the author has always found the appendix patent and lying free. *Amoebic dysentery* has greatly increased since the War began; it is very common at ages from 3 months upwards. *Fatty liver* is often found at autopsies of recurrent amoebic dysentery. *Cholelithiasis* is not seen. About one in every eighty internal admissions to the Colonial Hospital is a case of *interstitial nephritis*; syphilis is probably the main cause.

Syphilis is very common; the rarity of parasymphylis is attributed to death from intercurrent disease before it shows itself. "There is a very definite syphilitic syndrome to be seen in prisoners, for example, i.e., pains in the back and waist, anaemia, thickened veins, lethargy. The tested blood shows Wassermann reaction positive, and treatment quickly cures the condition. It is a very remarkable fact that congenital syphilis is rarely seen." No case of interstitial keratitis has been met with in the last ten years. Of 256 convicts 53 had positive Bordet-Wassermanns. Quite a number of cases of locomotor ataxia are met with at the prison. *Gonorrhoea* is very frequent, but on the other hand ophthalmia neonatorum is surprisingly rare. Chronic *otorrhoea* is rarely seen, and no case of mastoid disease is on record; the absence of adenoid growths is suggested as a cause. Rickets is believed to be increasing.

Such are some of the points of an interesting paper.

A. G. B.

(TRAPELLAT. Rapport sur l'état sanitaire du bataillon de tirailleurs sénégalais de Rufisque (Sénégal), Oct. 1913 à Avril 1914.—*Ann. d'Hyg. et de Méd. Colon.* 1914. July-Aug.-Sept. Vol. 17 No 3. pp. 825-832. [Received 1919.]

In a battalion of Senegalese during six months the morbidity was over 15 per cent. and the mortality 1.7 per cent. though the camp was healthy and the work light. The chief affections were diseases of the chest, beriberi (7 deaths out of 13), digestive disturbances, and ulcers of the lower limbs. These are attributed partly to climatic conditions—recruits were brought from the south in the winter—and partly to diet. A consideration of the latter shows that it yielded not more than about 2 000 calories, of which the bulk was made up of carbohydrates (rice) with a decided lack of proteids and fats. Each man has to make his own messing arrangements for which he pays out of his allowance. The author points out that if the messing were managed by the company a much more efficient ration could be provided for the same money.

A. G. B.

Roy (J. N.). The Eyesight of the Negroes of Africa.—*Arch. Ophthalmology.* 1919. Jan. Vol. 48 No. 1. pp. 72-83.

The author, who is Physician to the Hôtel-Dieu, Montreal, has visited twenty two colonies in Africa and examined about 5,000 negroes belonging to a hundred tribes. He used the special de Wecker chart, made up of a certain number of squares of different dimensions with one side left out, and retinoscopy. Vision in the same person, he finds, is "better in Africa than in Europe," and he regards "as the normal vision of a European in the tropical countries. His investigations showed that simple myopia, always of a mild degree, was found in 1.5 per cent., myopic astigmatism in 1.5 per cent., simple hypermetropia and hypermetropic astigmatism in 2.5 per cent. No case of mixed or irregular astigmatism was seen. The average vision was found to be $\frac{1}{4}$, and the highest recorded was $\frac{2}{10}$ in a man with sleeping sickness. He never observed any alteration of the colour vision or hemianopsia. A series of experiments was made to compare the vision of Europeans and negroes in the dark, with the conclusion that "the negroes see at night from two to four times better than the whites," which he suggests is due to their greater use of their eyes at night. The African natives have also a greater power of accommodation than the whites, a statement which he supports by a table of 50 observations, this was tested in negroes who could read between 13 and 20. He believes that the ocular pigment which the African has in abundance is one of the main agents of his excellent vision; it absorbs some rays of light and neutralises the ones that are irregularly reflected on the retina. He anticipates that with "the increased absorption of a more or less adulterated food and of the alcoholic beverages. . . with the advance of instruction in schools and workshops, with at places the use of artificial light" the natives will not keep up their visual power, which at present causes them to head the scale.

[The value of this paper would be increased were there more figures and a list of the localities visited.]

A. G. B.

HUPPENBAUER (Karl) *Chirurgische und ophthalmologische Erfahrungen von der Goldküste.* [Surgical and Ophthalmological Experiences on the Gold f. Coast.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1918 Oct Vol. 22. No. 19 pp. 341-364. With 5 figs

The author was medical officer to the Basle Missionary Society on the Gold Coast from 1913 to December 1917, when his work was brought to an end. The number of patients seen daily averaged 95 in the pre-war part of 1914 and afterwards fell to 27. He notes the infrequency of *tuberculosis* of the bones and internal organs, and of *tetanus* except after gun shot wounds and child birth. *Tumours* formed 0·9 per cent. (malignant 0·35 per cent.) of the admissions in 1914, and their removal accounted for 15 per cent. of all surgical operations. The malignant tumours were nearly all sarcomata. The author was surprised at the absence of mammary cancer, though the breast is a much mal-treated organ. *Keloid*, as elsewhere in Tropical Africa, is common. No case of undoubted *appendicitis* was seen. There is no record of *gall-stones* in the clinical and post-mortem material. [It is nowhere stated how many post-mortems were made.] *Umbilical hernia* is very common in children and disappears later in life. *Inguinal* and *femoral hernia* formed 1 per cent. of consultations and 3 per cent. of the operations, the proportion of left sided to right sided was 2/3. *Urinary calculus* was not seen, despite the frequency of cystitis from various causes and of bilharziasis, and the numerous opportunities for its discovery in the passing of instruments for stricture. *Piles* and *anal fistula* were very common. *Ulcers* and especially those of the lower extremities made up the bulk of the surgical clinic; syphilis and yaws are common and any small injury may lead to tropical ulcer; the author enters a protest against the frequency with which such ulcers are put down as syphilitic and notes that abortion and interstitial keratitis are no commoner than in Germany. *Ainhum* is described without a comment on its incidence, and some cases of *goundou* are illustrated. Another affection mentioned is *periostritis* of the late rainy season for which some patients have periodically come for the last ten years for a bottle of potassium iodide mixture. The clinical picture of *rickets* was seen "in a few cases." Special attention was given to eye diseases, for which the paper must be consulted. Interstitial keratitis was among the rareties.

A. G. B.

ARCHIBALD (R. G.). *Epithelial Xerosis of the Conjunctiva in Natives of the Sudan.*—*Jl. Trop. Med. & Hyg.* 1919. May 1. Vol. 22. No. 9. pp. 81-83. With 1 plate.

The three cases seen were in boys (2) and an adult. In all both eyes were affected with xerotic areas situated on the conjunctiva external and close to the corneal margin, measuring 0·5 cm. in diameter, white and of a viscid consistency; no impairment of vision nor discomfort. Smear preparations showed large numbers of Gram-positive bacilli of diphtheroid appearance. The cultural character and biochemical reactions are described. The organisms were non-pathogenic to guinea pigs, but when placed on the conjunctiva of a rabbit produced the disease. The author thinks that this affection has not

previously been described from the tropics. The dry condition usually described was absent. The conclusions are:—

"(1) A form of epithelial xerosis of the conjunctiva exists among the natives of the Sudan.

"(2) In three cases observed, diphtheroid bacilli allied to the *B. xerosis* group were present in the xerotic areas.

"(3) Experimental inoculation with material obtained from one of the cases produced xerosis of the conjunctiva in a rabbit"

A. G. B.

RODHAIN (J.). *Observations médicales recueillies parmi les Troupes coloniales belges pendant leur campagne en Afrique Orientale 1914-1917.*—*Bull. Soc. Path. Exot.* 1919. Mar 12. Vol 12. No. 3. pp. 137-158.

The Belgian troops operating against the Germans in East Africa consisted of 10,000 natives with 1,000 Europeans and native porters varying between 10,000 and 15,000. The periods with which this Report deals were the two offensives, one from May to December 1916, when Tabora was taken, and the second from April 1917 to March 1918, which brought the Belgian battalions to the Rovuma river. The alimentation and clothing of the troops left much to be desired. The campaign was severe, in a climate to which most of the natives were unused and in countries with diseases new to the majority of them. Under such conditions the morbidity and mortality were high. This is illustrated by a chart showing the total mortality and that for five groups of diseases in the soldiers, separately for the two offensives, and in the porters during the second period. The general mortality among 10,000 porters reached the high figure of 24.8 per cent. of which intestinal diseases made up 9.2 per cent. diseases of the respiratory passages 6.14 and pneumonia 1.9. The figures for the troops were happily 4 to 5 times less, 6.7 per cent. in the first, 1.8 in the second offensive. Several reasons for this difference are given.

Parasitic Intestinal Affections.—These consisted chiefly of bacillary dysentery. In some hospitals 61 per cent. of those attacked died. The author gives some of his own observations at a camp near Lake Kivu. Here at the outset hygiene was unknown. Water came in insufficient quantity from the distant lake and the men drank it from muddy pools after rain, the rations consisted chiefly of meat to which they were not accustomed; they slept crowded together. In 25 fulminating cases in which autopsies were made the only lesion was acute inflammation of the whole mucosa of the large intestine. It was swollen, often of a livid aspect, with scattered haemorrhagic points. Sometimes the inflammation extended through the wall to the visceral mesentery. The lesions of amoebic dysentery were seen only once. Later the serums of 8 patients, infected at Albertville and Ujiji were tested against Shiga, Flexner and Y bacilli. Agglutination at dilutions stated were obtained with both Shiga and Flexner. In the chronic stage the symptoms are those of ulcerative colitis, which is very resistant to treatment.

The author states that in the equatorial forest region of the Congo bacillary dysentery is rare while amoebiasis is common.

Diseases of the Respiratory Passages. Pneumonia.—The virulence of the pneumonia microbe was shown by the rapidity of the fatal termination, the frequency of jaundice, the large number of suppurating pleuritis and pericarditis and the high proportion of meningitis.

which formed more than 3 per cent. Lesions of the liver and kidneys were seen at autopsy, such as those recorded by JOURN [see this *Bulletin*, Vol. 12, p. 130]. The 700 Europeans with the troops were not attacked though there were 2,158 cases of pneumonia and broncho-pneumonia in 1917 among the blacks

Epidemic Cerebro-spinal Meningitis—This disease was introduced in 1916 by the porters coming from East Africa and Uganda. At one time 70 per cent of porters attacked died, no European contracted the disease. The author goes into the history of the disease in Tropical Africa. It was first noted by BALFOUR in 1904 in the Soudan and reached the equatorial regions comparatively recently. The higher altitudes favour it more than the lower and more humid. The author speaks of it as the "second plague [tuberculosis being the first] brought by European civilisation to the black populations of Central Africa."

African Relapsing Fever.—All the ex-German territory is infested with *Ornithodoros moubata* which many of the Congolese soldiers had never met. At one time relapsing fever was the cause of one death in every six. The black troops could not be kept out of the infested native huts

Enteric Fevers—Only 26 cases occurred

Beriberi—This disease occurred in 1914-15 in the Lukuga valley to the west of Lake Tanganyika, where there had lately been an epidemic described by WYDOOGHE [see this *Bulletin*, Vol. 12, p. 368]. At the end of 1917 the rations had to be altered. The quantity of meat was reduced and manioc flour of poor quality took the place of rice and maize. Cases of polyneuritis rapidly appeared at Dodoma, Tottorp, and Lugufu, and several deaths occurred. For some months fresh vegetables had been unobtainable. The patients rapidly recovered on an abundant and varied diet

Malaria.—In 1917 some natives were employed as porters from mountainous regions where malaria is absent. So many succumbed to malaria that the services of this tribe had to be dispensed with. The authorities had been warned that such would be the case.

Dr. Rodhain concludes with the remark that cosmopolitan diseases—infections with pneumococcus, meningococcus, and dysentery bacilli, played the chief part in the pathology of this campaign.

A. G. B.

WALLER (H. W. L.). A Case of Acute Appendicitis in a Native of Africa. —*Jl. Trop. Med. & Hyg.* 1919. Jan. 1. Vol. 22. No. 1. p. 1

The case of a young Swahili woman, living as nurse in an English family at Zanzibar. At operation the appendix was found to be "large, thickened, acutely inflamed, densely adherent to the caecum and surrounding structures." The author believes that appendicitis is exceedingly rare in the African native.

A. G. B.

SICK (P.). Bekämpfung der Säuglingssterblichkeit in Deutsch-Ostafrika. [Reduction of Infant Mortality in German East Africa.]—*Deut. Med. Woch.* 1919 Feb. 6. Vol. 45. No. 6. p. 158

A missionary named DANNHOLZ, who died later of dysentery in Egypt, took a course of instruction at the German Institute for Medical Missions at Tübingen, and returning to his post directed his energies to

reducing the infant mortality of his district, the high figure of which was due partly to murder for superstitious reasons but mainly to insufficient clothing and unsuitable food. Before 1909 80 women had 640 children of whom 463 died, a mortality of 75 per cent. In his last 4½ years 110 women had 162 children of whom 21 died, mortality 13 per cent. [Such fertility as that of the first period is surely unusual in Tropical Africa.]

A. G. B.

BOYD (Francis D.). **Experiences of a Consulting Physician on Duty on the Palestine Lines of Communication.**—*Edinburgh Med. J.* 1919. May. Vol 22. No. 5. pp 276-287.

Of the space occupied by this paper malaria takes 7 pages, and other diseases together 4. The various manifestations of subtertian malaria are described, and stress is laid on the influence of the toxæmia on the myocardium. In convalescence "any exertion or too early return to duty inevitably led to cardiac dilatation and a circulatory break-down." Of 50 deaths from subtertian malaria 10 each were due to toxæmia with cerebral symptoms and toxæmia with cardiac failure, 13 had pneumonia, and 7 were of the bilious remittent type, 4 were "imperfectly treated." In 37 consecutive post-mortems [? interval since death] in which search for the parasites was made in the spleen and bone marrow they were found only in 9 cases, their non-discovery is attributed to successful treatment. Other diseases discussed are dysentery, bacillary and amoebic, enterica, relapsing fever, typhus, para-cholera and sandfly fever. The Egyptian type of relapsing fever differed from the Palestine type in that in the latter pyrexia was short and spirochaetes were hard to find.

A. G. B.

MENDELSON (Ralph W.). **Tropical Diseases Observed in Siam.**—*Jl. Amer. Med. Assoc.* 1919. Apl. 26. Vol. 72. No. 17. pp 1199-1205 With 9 figs.

The author, who was Sanitary Expert to the Siamese Government, 1916-18, gives here an account of the tropical diseases seen by him in the out-patient department of the Central Hospital at Bangkok.

Among skin diseases are mentioned *juxta-articular nodules*, several cases in Siamese. Of 100 ulcers examined 10 showed spirochaetes of Type A, EGGERS [see this *Bulletin*, Vol. 5, p. 381], the author considers this to be a super-imposed infection, as the same spirochaete was found in a great variety of diseases. In two of the ulcers Leishmania was detected as well as the spirochaete. Hundreds of persons succumb to *plague* every year. Ambulatory plague is common; pneumonic plague was not seen. Sudden death of a number of cats was found to be due to this disease. Its suppression is difficult because the people are Buddhists and will not kill rats: "vested interests" seem equally formidable, the Europeans as well as the natives blocking improvements. One case of *kala azar* was seen in a Siamese who had never left the country. *Filarial disease* is not uncommon, with its usual complications; "Bangkok fever" is usually filarial.

Siam is estimated to contain 5,000 *lepers*; the Government neither segregates nor treats them. The history of two cases treated with

sodium gynocardate and sodium gynocardate "A" is given with photographs. *Yaws* is very common and *syphilis* is rampant. Hundreds of cases were seen but only three implicating the nervous system (cf. MONTÉL, this *Bulletin*, Vol. 12, p. 131). *Beriberi* is very common. The majority of the patients were policeman who eat polished rice in the city and when they are given sick leave home eat hand-milled rice, on their return they resume the polished rice diet. *Pellagra* is not uncommon. Between 20 and 25 per cent of blood films examined showed malarial infection; the great majority were chronic subtertian. The author knows of only one house in Bangkok that is screened. *Blackwater fever* is seldom seen, except up-country.

Several cases of *rat bite fever* were recognised. *Dengue* is epidemic yearly and *phlebotomus fever* is not uncommon. *Relapsing fever* was seen in two Siamese who had not been out of the country. *Typhoid fever* is believed to exist, but was not seen; the author suggests that the Siamese has acquired immunity. Both *amoebic* and *bacillary dysentery* are common. *Intestinal parasites* are very common. No cases of *cholera* were seen though a few years ago it was endemic.

"It is a fact that since the city has built the new and up-to-date water-works, cholera has disappeared. Now it so happens that the perfectly good city water supply does not supply the entire city. As a matter of fact, that part of the city of Bangkok that lies on the east side of the Menam River is not supplied at all, and many parts of the city proper still use the dirty water of the river: therefore, it cannot be said that the new water supply did away with cholera; it simply disappeared."

Venereal diseases and *pulmonary tuberculosis* head the list of admissions to the clinic. *Climatic bubo* is often seen. The French hospital in Bangkok averages one case a day of *tetanus* in the new-born. The patients are mostly Chinese. *Tetanus* in the adult is rare.

A. G. B.

BARRY (C. C. S.). Analysis of 1,200 Consecutive Abdominal Operations performed for Gynaecological Disease on Burmese Females.—*Indian Med. Gaz.* 1919. Jan. Vol. 56. No. 1. pp. 5-14.

The author writes.—

"As regards diseases peculiar to their sex, it appears to me that Burmese females suffer from no special liability, nor enjoy any special immunity, and that their ailments behave in a very similar manner to those of women in more temperate climates under more civilized conditions of life. In the accompanying table of operations the relative frequency of particular operations does no doubt vary from a similar list of consecutive operations at a large English hospital, but such variations are mainly due to the fact that the practice of gynaecology is at present in its infancy in Burma. . . . Any list of operation does no more at present than notify the occurrence of the various forms of gynaecological disease, and cannot be considered as a record of their relative frequency."

Several tables are furnished.

A. G. B.

KRAUSE (Gregor). Einiges über die Hygiene bei den Baliërn. [On Hygiene of the Natives of Bali Island.]—*Janus.* 1919. Mch.-Apl. Vol. 24. No. 3-4. pp. 101-114.

The Island of Bali, to the east of Java from which it is separated by the Sunda Straits, is difficult of access and remote from the great trade routes. The author resided there from 1912 to 1914. An account is given of the burning of the dead bodies, the inhabitants being

Hindus, and of the birth customs. Great care is taken of the stump of the umbilical cord, but none the less many infants fall victims to sepsis and tetanus. Circumcision is not practised; to its absence the author attributes the frequency of cancer of the penis; he operated on 16 cases in 18 months. The number of lepers is estimated at 1,000. Syphilis is well-known, yaws is rare. Cholera has been frequently imported from Java and leads in the plains to severe epidemics. Here the water supply is neglected, in the hills it is usually in the grounds of a temple or is protected by the statue of a god, and no pollution is suffered. Dysentery occurred chiefly in the dry season in the hills and had a mortality of about 35 per cent. Owing to the failure to find entamoebae the author believes that it was bacillary. Malaria was not seen in his district, nor any form of tuberculosis. Goitre occurred in a few villages high in the mountains. Round worms were frequent in the natives, other intestinal parasites rare. *Ulcus tropicum* was the predominating skin disease. Hysteria was common.

A. G. B.

SITSSEN (A. E.). *Pathological Anatomy of Tuberculosis in the Dutch Indies*. [Also in Dutch.]—*Med. Burgerlijk. Geneesk. Dienst in Nederl.-Indië* 1919. No. 4. pp. 1-24.

The author notes that altitude and race are the most important factors in determining the site and character of tuberculosis in man in the tropics. His conclusions are based on the examination of the bodies of 59 natives, 5 Chinese and 4 Europeans, all adults. For natives they are as follows.—

"1. Only in about half of the lethal cases of tuberculosis amongst adult Natives the lungs took the first place, in the remaining cases the process had more especially attacked the lymphatic glands and the serous membranes.

"2. Though very often there is an inclination to chronic process in the lungs, the acute process, namely pneumoniae, are taking a much more important place than in Europe. Repeatedly the lungs are being attacked throughout by these processes.

"3. Early calcification of the cartilage of the first rib, which so often is seen in chronic pulmonary tuberculosis here is an exception.

"4. Intestinal tuberculosis as complication in serious processes in the lungs is occurring very frequently, primary intestinal tuberculosis is rare, if it does occur at all.

"5. Localisation of the process in other parts of the body (urogenital system) does occur very seldom; the spleen only being an exception."

He concludes with a "Scheme for the examination on Tuberculosis," and suggests that this should be generally followed. If reports are sent to him he will undertake to complete the data.

A. G. B.

DE LANGEN (C. D.). *Folk lore about Tuberculosis in the Neth.-Indies*. [Also in Dutch.]—*Med. Burgerlijk. Geneesk. Dienst in Nederl.-Indië* 1919. No. 4. pp. 25-40.

The author sent out 190 copies of a questionnaire to native surgeons and others likely to come in contact with sick natives; 63 were returned with more or less full replies. These and the yearly reports of various Hospitals for Natives form the basis of this paper. It is noted that tuberculosis is not confined to the densely populated cities, and that it very rarely occurs before puberty.

A. G. B.

FLU (P. C.). Investigations concerning Carriers of Meningo cocci. [Also in Dutch.]—*Meded. Geneesk. Lab. Weltevreden*. Batavia 1917-1918. 3rd Series A. Part 1 and 2. pp 138-155.

In 1915 an epidemic of cerebrospinal meningitis occurred among the military police at Soekaboemi, Java, in consequence of which they were removed to the quarantine island off Batavia. On the island 600 were examined within 2 weeks, and 31 or 5.1 per cent. were found to be carriers of meningococci. No fresh cases however occurred and in August, after 3 months, the men were brought back and lodged in new and more spacious barracks, but not long after fresh cases of meningitis appeared. Possible reasons are discussed and amongst them importation of the disease into the barracks by recruits from various parts of the Archipelago. To throw light on this the recruits were detained at Batavia and there examined, 534 persons, men, women and children, and 145 healthy males. Of these persons 12 were positive, all having been examined twice or more times. The twelve strains of cocci all complied with certain tests which are detailed, both biological and agglutinatorry. The author concludes that the cocci were true meningococci and that they are found in 1.8 per cent of healthy persons who had not been in contact with sufferers from meningitis. Hence the most probable explanation of the second outbreak at Soekaboemi is that the healthy recruits, carriers of meningococci, reintroduced the disease. His conclusions, in part, are as follows.—

"3. In combating cerebrospinal meningitis, search for carriers of cocci and isolation of these persons is not imperative and even not rational, in view of the fact, that cocci which cannot be distinguished from the meningo coccus are also found in perfectly normal persons. Moreover the search is very often combined with so many difficulties that in the majority of cases it can not be made in a satisfactory manner.

"2. In combating cerebrospinal meningitis prophylaxis should be given a first place; this prophylaxis to consist in:

"(a) Erection of appropriate, airy but nevertheless rain and wind proof buildings for persons who are obliged to live together in great numbers

"(b) Care should be taken to allow for sufficient open space between the sleeping-places

"(c) Recruits, who are in training in a climate, favourable to the appearance of the disease, should not be exposed to too great exertion, before being properly acclimatised.

"The diseases once having made its appearance, and should the living rooms be crowded, the men should be given more room; if the disease does not disappear quickly transfer of the men should be considered to a climate unsuited to the spread of the disease, which in the Tropics should be a coast climate."

A. G. B.

BAYMA (Theodoro) & RANGEL PESTANA (Bruno). *Parasitismo Intestinal nos Imigrantes Japonezes*.—7 pp. 1918. *Servico Sanitario do Estado de São Paulo*. São Paulo: Typ. do "Diario Oficial."

The authors draw attention to the prevalence of intestinal parasites in Japanese and Chinese immigrants into Brazil and make the following recommendations:—

1. An official medical inspection of immigrants into Brazil is called for as an indispensable prophylactic measure to prevent the entrance into the

country of persons suffering from communicable parasitic diseases and the consequent increase of those already existing.

2. It is desirable that those infected should, if repatriation is impossible, be detained until they have undergone treatment and their cure has been definitely established.

F. S. Arnold.

BLON. Sur un cas de goundou à Kayes.—*Ann. d'Hyg. et de Méd. Colon.* 1914. July-Aug.-Sept. Vol 17. No. 3. pp 1008-1009. [Received 1919.]

A native aged one, no sign of syphilis in the parents, presented at birth tumours of the size of lentils on each side of the nose, at present the size of almonds. They gave a sensation of fluctuation but puncture did not discover any fluid. No further tumours or anything abnormal was observed, except difficulty in swallowing and nasal expiration owing to the obstruction caused by the tumours. The author concludes that goundou may be congenital, and that it seems to be independent of any bony or periosteal origin or of any syphilitic or framboesial antecedent.

A G. B.

BHATT (J. C.) & HIRANANDANI (K. M.). Epidemic of Influenza 1918. pp. 8 Hyderabad (Sind): Standard Printing Works

An account of the epidemic as seen by the writers in Hyderabad, Sind, in October and November, 1918, in which a "great majority of people were attacked simultaneously" They describe an uncomplicated febrile type, a respiratory type in which pneumonia was common, and a gastro-intestinal type. No indication is given of the mortality.

A G B.

TEISSONNIÈRE, BÉQUET, JOLLY. Observation d'une épidémie de grippe à l'Armée d'Orient (mal-juin, 1918).—*Bull. Soc. Path. Exot.*, 1918. Oct. Vol 11. No. 8. pp. 738-744. With 3 charts.

The epidemic, which presented all the well known characters of influenza, was very severe and definitely infective; though the greater number of the cases ran a benign course, those with broncho-pneumonia or pneumonia were almost always fatal. The charts show the usual secondary pyrexial rise in these cases. The diagnosis from three day (phlebotomus) fever was established by the shortness of the incubative period, the parallelism of pulse and temperature, the absence of evidence of punctures made by the flies, and the frequency of severe pulmonary complications.

P. W. Bassett-Smith.

COUTANT (A. F.). An Epidemic of Influenza at Manila, P.I.—*Jl. Amer. Med. Assoc.* 1918. Nov. 9. Vol 71. No. 19. pp. 1566-1567.

The epidemic spread rapidly among those working in and around the docks, and from these to others. It commenced in June, that is, earlier than most of the other reported outbreaks. From this the author surmises that the Philippines may have been the original

centre from which the pandemic started, though he stated that 30-40 cases occurred in an American transport from San Francisco which left that port before the epidemic appeared at Manila.

The slow pulse, absence of skin rash, and rapidity with which the disease spread, differentiated it from dengue. The mortality was 2 per cent., death being generally due to pneumonia. Pfeiffer's bacillus was isolated from the sputum, but blood cultures were sterile.

P. W. B.-S.

SCOTT (G. Waugh). **Epidemic Pneumonic Influenza as seen in Malaya.**—*Brit Med. Jl.* 1919. March 15. pp. 305-306.

The epidemic broke out in Tamils on a rubber estate and was very fatal. Its features are here described. About 50 per cent. of the patients had malarial parasites in the blood but the course of the disease did not seem to be affected, the mortality being equal in those with parasites and those without. [Cf. this *Bulletin*, Vol. 13, p. 283.]

A. G. B.

ACTON (H. W.). **The Diagnosis of Acute Infections of the Throat occurring amongst Troops of the Mesopotamian Expeditionary Force.**—*Indian Jl Med Res.* 1918. Oct Vol. 6 No. 2. pp. 152-156.

The author examined 151 cases of acute sore throat in British troops.

Micrococcus catarrhalis and *M. paratetragenus* were isolated 43 times.

Diphtheria bacilli. " " 23 "

Streptococci " " 17 "

Pneumococci " " 6 "

Vincent's angina or fusio-spirochaetal affection of the tonsil was found 16 "

A yeast-like fungus was isolated 8 "

The diphtheria bacilli are classed as short (8 cases) intermediate (12) and long (2). The short are believed to be avirulent, the long are found in severe cases; animal tests could not be made. In the case of Vincent's angina a direct smear from the membrane shows a pure culture of the fusiform bacilli and the long fine *Spirochaeta vincenti*. In the mycotic cases a smear is made and then a culture in saccharose agar. Only 19 cases of sore throat were seen in Indian troops, 7 of which were due to *catarrhalis* infections and none to diphtheria. The author concludes that Indians have a relative immunity against acute infections of the throat. With regard to bacteriological diagnosis the author writes:—

"A clinical diagnosis or, failing this, a brief history of the case should be sent, accompanied by:—

"(i) A direct smear made from the membrane of inflamed area, thereby allowing the bacteriologist to eliminate Vincent's or mycotic anginas

"(ii) A swab should be taken.

"After examining the stained smear, the bacteriologist is then in a position to decide as to the most suitable media required for cultivating these different organisms."

This is a good paper, every word to the point.

A. G. B.

DE MELLO (H') & FERNANDES (L. G.). Sur la fréquence du parasitisme des voies respiratoires humaines par des champignons du type des levures. [Also in Portuguese.]—*Arquiv. Hig. e Pat. Exót.* 1918. March. Vol. 6. pp. 61-69.

The author at Nova Goa examined 102 sputa from persons of whom 52 were suffering from some pulmonary or bronchitic affection. In only 6 cases were yeasts cultivated, two in 10 cases of tuberculosis, two in 3 cases of bronchitic asthma. In the two asthmatic cases no other pathogenic agent was discovered. The yeast in almost every case was *Endomyces vuillemini*. In 21 cases out of 24 in which the saliva was examined in the rainy season in hanging drop yeasts were found. The term broncho-levuroses is preferred to bronchomycoses for these affections. The slight cases yield rapidly to iodides.

A. G. B.

DE MELLO (F.) & PAES (A.). *Endomyces Cruzei*, n. sp. Agent (?) d'une endomycose bronchique simulant l'asthme. [Also in Portuguese.]—*Arquiv. Hig. e Pat. Exót.* 1918. March. Vol. 6. pp. 51-60.

The sputa of the patient were sent for examination for tubercle bacilli. They were noticed to be gelatinous, airless, transparent, with greenish reflections, and were found to be infected with yeast cells. The man was examined but had at the time no abnormal physical signs. A description follows of the parasite, with its culture and fermentation reactions. It was an *Endomyces*, differs from *E. vuillemini* and is described as a new species. Whether it was or was not the cause of the asthmatic symptoms could not be determined.

A. G. B.

DE MELLO (F.), PAES (A.) & DE SOUSA (L.). Un cas de saccharomycose avec abcès multiples simulant la scrofuleuse. [Also in Portuguese.]—*Arquiv. Hig. e Pat. Exót.* 1918. March. Vol. 6. pp. 17-40.

The patient was a girl of 20 whose illness began in infancy with an axillary abscess having a fistula which discharged for 12 years. On admission there was a large abscess in the axillary region which was supposed to be tubercular. It was punctured by one of the authors who found cells of the yeast type within giant cells. The fungus was cultivated and shown to be a *Saccharomyces*. A long list is given of the species of this genus which have been described. Internal treatment was by iodide of potassium, and external by the "liqueur de Villatte" (subacetate of lead, sulphates of copper and zinc, and white vinegar) with apparent cure, but the authors add a postscript to the effect that the disease had broken out again.

A. G. B.

DE MELLO (F.) & PAES (A. S. A.). Un cas de nocardiose pulmonaire simulant la phthisie. [Also in Portuguese.]—*Arquiv. Hig. e Pat. Exót.* 1918. March. Vol. 6. pp. 133-206.

The patient entered the Hospital at Nova Goa six years before with stubborn cough, night sweats, and great weakness. He was treated for pulmonary tuberculosis and later discharged. In 1917 he was admitted

for the third time. His sputa were examined for tubercle bacilli without result, and the symptoms were so typical that a second examination was made. This time yellow concretions were noticed, of a hard consistence, resembling the grains of actinomycosis which they proved to be. The patient improved rapidly under large doses of potassium iodide. An account is given of the physical signs which the patient presented and of the cultural reactions of the parasite. The bulk of the paper is occupied by a critical study of the genera *Nocardia* and *Cohnmstreptothrix* in which the authors follow CHALMERS and CHRISTOPHERSON [this *Bulletin*, Vol. 9, p. 205]. They finally state that their parasite, except for small differences, resembles *Nocardia bovis* de Harz 1877.

A. G. B.

SHILLONG, KING EDWARD VII. MEMORIAL PASTEUR INSTITUTE. The First Annual Report for the year ending 31st December, 1917. (R. KNOWLES)—33 pp. 1918. Shillong: Printed at the Assam Secretariat Printing Office.

This, the first annual Report from the Pasteur Institute, Shillong, is divided into three parts, one restricted to the antirabic treatment and problems, the second to general bacteriological and research work, and the third to tables and administrative details.

Five hundred and sixty nine persons underwent the complete course of antirabic treatment; there were four failures, a rate of 70 per cent. The patients were followed up on the postcard system with very satisfactory results. Of the Indian cases 19 per cent. had been bitten by rabid jackals. It was found that the jackal bites more persons, inflicts more and deeper wounds and bites more frequently on the head than the dog. The tea-garden patients are considered separately; they numbered 147. Under the heading Research Problems in Rabies, with respect to the best methods of treatment of hydrophobia it is pointed out that reagents known to destroy the rabies virus are carbolic acid, the aldehydes, formaldehyde vapour and perchloride of mercury in stated strengths. These were tested in various ways on fixed virus rabbits.

In August 1917 typhoid fever threatened to become epidemic in a suburb of Shillong. A vaccine was prepared with which 1,775 Indians and 182 Europeans were inoculated, the majority returning for a second dose. The natives submitted "with a surprising readiness." Only one case occurred among the inoculated persons. Twenty cases of kala azar were treated by intravenous tartar emetic only; 5 died and 15 recovered. The results of the experience gained are summarised and it is concluded that "successful treatment of actual cases may possibly prove a shorter cut to the eradication or limitation of kala azar in Assam than attempts at household removals over many years on a large scale." The results of the intravenous treatment of malaria by quinine have been recently given [see this *Bulletin*, Vol. 13, p. 78]. Work on cerebro-spinal fever and diphtheria is also summarised.

The statistical tables are of the usual character and give much information.

A. G. B.

DE VREGILLE (P.). Notice historique et statistique sur l'Institut Antirabique du Caire, 1899-1917.—*Reports and Notes of the Public Health Laboratories, Cairo*. 1917. No. 1. pp. 59-81.

Between 1899 and 1906 the Cairo Antirabic Institute was a private institution, administered by the Société de Bienfaisance Italienne. In April 1906 it became a Government Institution. Hence the account is divided into two parts. In the first period, when Dr. TONIN was in charge, 2,089 persons received the full treatment, the corrected percentage of failure being 0.5. In the second period, comprising ten completed years, the author was in charge for the greater part of the time. An account is given of the installation and of the working of the Institute. The method of treatment at present employed in severe cases is, the immediate injection of 20 to 25 cc. of antirabic sheep serum, and simultaneously, at a different point, of the ordinary series of vaccine emulsions, the latter being continued in stronger doses. The classification of patients adopted is, those bitten on the head, those bitten directly through the skin, and those bitten through clothes. Bites in Egypt are very severe. Some of the injuries caused are detailed. A number of tables give data for the whole period and for the several years. The total of persons treated was 7,382, of whom 5,973 completed the full treatment, the corrected percentage of failures being 0.78. Of the biting animals 5,393 were dogs (90 per cent.), 268 were cats, and 181 wolves. The monthly curve of patients has two maxima, one in March, the other in July. The first is the period of rut, the second that of highest temperature, but the influence of the latter is uncertain. The same chart shows that the treatment curve falls when that of the Nile flood is near its maximum, but there is no obvious connection between the phenomena. The author calculates that of the dogs which bit in 1915 and 1916 25 per cent. had rabies.

A. G. B.

CORNWALL (J. W.). Anaphylactic Reactions in the Course of Antirabic Treatment.—*Indian Jl. Med Res* 1919. Jan. Vol. 6. No. 3. pp. 237-247. 2 charts & 2 tracings

During the course of antirabic treatment, the author finds, there may occur one or more distinct effects which are given in the order of their frequency: (1) local cutaneous and subcutaneous tissue reaction; (2) general dermal reaction; (3) general systemic reaction in the form of malaise; (4) a reaction of the central nervous system in the form of temporary heart failure, occipital pain and nausea. It is suggested that these reactions are anaphylactic in nature. Attempts to reproduce the central nervous system reaction in rabbits and sheep did not succeed.

A. G. B.

NASSY (J. G.) & WINCKEL (Ch. F. W.). Konservierung von Virus fixe. [Conservation of Fixed Virus]—*Arch. f. Schiffsh. u. Trop.-Hyg.* 1918. Dec. Vol. 22. No. 21. pp. 438-422.

In the tropics, where distances are great and means of travel poor, persons bitten may not be able to reach the Antirabic Institute without undue delay. Remedies are the erection of several institutes or of

several virus depots; for the latter the fixed virus, like vaccine lymph, must be capable of keeping for a long time. With this object in view the authors experimented with glycerine and a dry process. Rubbed up with glycerine and tested on guinea-pigs the virus was active for 3 months, if kept in the ice chest. Dried and kept in the dark at 17° C, it was virulent after five months, but at a higher temperature (22°) the virulence was soon lost

A. G. B.

YOUNG (Anne) Envenomization suggested as Etiology of Hydrophobia, Yellow Fever, Rocky Mountain Spotted Fever, and Cowpox.—*New York Med Jl.* 1919. March 15. Vol. 109. No. 11. p. 465.

The author suggests that rabies in dogs may result from the dog having eaten an animal "dying or dead from the bite of a venomous animal." The three other diseases "are possible results of a hemolytic venom." She states that "Central and South Africa are practically free from hydrophobia. They are also free of viperæ" [The first statement may be approximately true, the second is demonstrably incorrect.]

A. G. B.

CLELAND (J. Burton) Presidential Address. Delivered to the Royal Society of N. S. Wales, May 1, 1918. Issued Sept. 5, 1918. 165 pp. 1918. Sydney: Published by the Society, 5, Elizabeth Street.

Part II. of this address (pp. 32-165) is entitled "Rats and Mice." The official work of the author has brought him into "intimate personal contact" with these pests and he has much to say concerning them that is of interest. Special attention was directed to rats in Australia as early as 1900 when plague was reported in Sydney. He deals here with *Epinomys rattus*, *E. norvegicus* and *Mus musculus*. Data are given of the relative numbers of the two common rats, which seem to vary in different parts as well as in the interior of Australia. Investigations carried out in the Microbiological Laboratory in 1915-17 showed that the average litter of the *E. rattus* was 6.66, that of *E. norvegicus* 8.05, and that of the mouse 4.87, figures which show that in the absence of controlling factors increase may be very rapid. To get information of the relative frequency of travel by sea in the three species, between 1913 and 1917 a list was made of all rats and mice taken from ships berthing in Sydney harbour. After 325 voyages made by 189 vessels *E. rattus* was present in 293, *E. norvegicus* in 3 and *M. musculus* in 53. The average per voyage of *E. rattus* individuals was 9, and that of *E. norvegicus* .02.

Under diseases of rats, plague, rat leprosy, spirochaetal jaundice and rat-bite fever are discussed. Between 1900 and 1910 New South Wales had 617 cases of human plague, 674 and 580 cases of plague in *E. norvegicus* and *E. rattus* respectively, 257 in *M. musculus*, 4 in cats, and 9 in various mammals in the Zoological Gardens. Less complete details are given for the other States. The author discusses the analogies between human and rat leprosy and states that whilst about one in 80,000 of the inhabitants of New South Wales examined

at any particular time will be found to be leprosy, about one in 100,000 of rats may be expected to have rat leprosy. He suggests that leprosy both in rats and men is due to the accidental establishment in the tissues of an organism which is normally a saprophyte of the surroundings. Many cases of malignant disease in rats and mice have been met with and are described.

He goes on to the ecto-parasites of these rodents. In the routine examination of rats from 1909 to 1917 five species of flea were found: *Loemopsylla cheopis* 4,863, *Ctenopsylla musculi* 3,370, *Ceratophyllus fasciatus* 1,380, and a much smaller number of *Ctenocephalus canis* and *Pulex irritans*. *L. cheopis* is most abundant in February and March and these are the months in which epidemics of plague have most frequently originated. Data are given of other parasites of rodents, external and internal, which have been found in Australia.

The last part of the address and by no means the least interesting concerns phenomenal visitations of rats and mice in Australia and the mouse plague of 1917. The author summarises the available information as follows:—

"It appears that the common house mouse, which in the mild climate of Australia has taken much to the fields, as well as to houses, outhouses and barns, multiplied prodigiously during the season under review. This was due to the abundance of suitable food, first of all from stacks of wheat left over from the previous year, then from grain shed in the fields as the result of unusual wind and rain storms, and finally from the vast accumulations of fresh grain stored in the neighbourhood of these previous food supplies. These conditions were more or less prevalent over the wheat areas of New South Wales, Victoria and South Australia, leading to a general and almost contemporaneous increase over vast areas. Given an abundant food supply, no natural enemies existed in Australia in sufficient numbers to cope with such prolific breeders. The mice, having exhausted the food in the fields, or being disturbed by ploughing, then sought new stores, and invaded the stacks, gnawing the bags. The wheat escaped, and the stability of the stacks was endangered. The grain poured down, and the roofs collapsed, letting in rain. Thousands of tons of wheat were lost, partly through consumption by the mice, partly through damage by rain, partly through being spoilt by mouse droppings and tramped into the mud. The mice did not migrate in the ordinary sense, but followed trails of food to new districts, or were transported unwittingly by man to fresh areas. Ordinary means of trapping and poisoning failed, but by suitable fencing, clean stacks could be efficiently protected, and robbed wheat stored in these. The transport of grain to uninfested districts was a means of protection of value. With such measures, and the onset of cold weather, the damage done by the pest was diminished. Disease amongst them, probably subcutaneous abscesses and the ringworm favus, is thought to have played some part in decreasing their numbers, but I doubt whether such diminution was appreciable. Ringworms and superficial sores occurred to some extent in persons handling the spoilt wheat, and the former was unduly prevalent in other inhabitants of the affected areas."

Space does not admit further consideration of the subject, save to say that the most effective device for trapping was a double fence of galvanised iron round the stack so contrived that mice could get into the 3 foot space from stack or exterior, but could not get out. They were then driven into a pit and destroyed. Catches of 500,000 or 8 tons were thus made in one night; 600 tons in 6 weeks was the bag in North Western Australia. Rat virus was tried without success. All the mice were the common house mouse.

A. G. B.

DE RAADT (O. L. E.). De gewijzigde namen der Javaansche ratten.
[The Correct Names of the Java Rats]—*Geneesk. Tijdschr. v. Nederl.-Indie* 1918. Vol. 58. No. 6. pp. 1008-1009.

The author states that the rat described by JENTINK from West Java as *Mus diardi* is really a large house rat—there was an error of measurement. This and *Mus rattus griseiventris* Bonhote become *Mus rattus diardi* Jentink. To the Japanese field rat described by BONHOTE as *Mus jalorensis* the name *Mus rattus brevicaudatus* is now given.

A. G. B.

OWEN (W. O.). Illuminated Trap for Night Flying Insects.—*New York Med. J.* 1919. Apl. 5. Vol. 109. No. 14. p. 590. With 1 fig.

This device consists of a fruit jar with a layer of plaster of Paris and cyanide of potassium, after the fashion of a "killing bottle" In the bottom is fixed a small electric bulb operated by a small battery, and the whole is enclosed in a tin receptacle. It is said to be of special service in capturing mosquitoes.

A. G. B.

BACOT (A.) & TALBOT (G.). The Comparative Effectiveness of Certain Culicifuges under Laboratory Conditions.—*Parasitology*. 1919. Feb. Vol. 11. No. 2. pp 221-236. With 1 text fig.

The experiments here recorded were carried out in London on *Stegomyia fasciata*. For the method of rearing the mosquitoes, details of the preparations tested and the method adopted, the original must be consulted. The authors note that a really efficient culicifuge has yet to be found. The following is extracted from the authors' summary —

"In the first series of trials conducted within 15 minutes of application, eight preparations out of a total of 22 tested gave satisfactory results. Their active ingredients were (1) Oil of Cassia and Camphor, (2a) Oil of Cassia and Peppermint, (5) Oil of Eucalyptus and Citronella with Phenol, (9a) Crude Naphthalene (coke oven) and Camphor, (10) Crude 'Parasitox,' (15a) Light Wood Oil, (21) Oil of Turpentine, (22a) 'Lawson's Anti-mosquito Compound' These preparations were then tested to ascertain for what period their protection could be depended upon. Preliminary trials indicated that this period was not likely to extend for more than two hours between treatment of the arm and exposure in the cage. None of the preparations gave complete protection in this series of trials; the most efficient were Nos. 1, 21, 2a, 15a, and 9a, over a two hours period.

"It appeared, however, that the two experimenters were unequally attractive to the mosquito. Making allowance for this, preparations 2a, 1, 15a, and 21 were almost on a parity, followed by 9a, 10 and 5 in order.

"Observations on the behaviour of the mosquitoes during the tests suggest that the protection afforded does not result from a dislike of the insects to the culicifuge but to its obscuring the attractiveness of the human odour.

"Regarding the make up of the essential ingredients it was found that fluid preparations were inconvenient and tended to be wasteful in application. Soap preparations, unless very soft, are apt to be difficult of economic use and in either case are more readily dissipated by perspiration than waxy or greasy ones. Culicifuges prepared with grease are more easily applied but are not so lasting as those put up with wax. Soft wax preparations, correctly adjusted to the temperature in which it is proposed

to use them, are most suitable for out of doors use, especially in the case of troops. The retarding volatilisation caused by the admixture of the active ingredients with wax or grease is a distinct advantage, but care must be exercised in respect of the relative proportion of active substance to the base. The golden rule is to use as much of the active constituent and as small a quantity of the inert base as is consistent with convenient application and the prolonging of the period of efficiency, not, as most proprietary compounders appear to think, as little as possible."

A. G. B.

D'ORMEA (Guido) Sull'uso della pomata al timolo come misura culicifuga per le truppe in servizio in località malariche. [Note on the Employment of a Pomade of Thymol as a Culicifuge for Troops in Malarial Districts.]—*Giorn. de Med. Milit.* 1919. Feb. Vol. 67 No. 2 pp. 296-300.

The author's experiments were carried out on troops stationed at Porto Corsini, the promontory which contains the mouth of the Porto Corsini Canal which unites Ravenna with the sea. The locality is highly malarial and swarms with mosquitoes. The first experiment was made with 42 marines on sentry duty on the parapet of the fort. The thymol ointment or pomade was smeared freely on face, neck and hands. It was found that if applied in sufficient quantity it remained effective for 7 or 8 hours. To get the maximum effect the men applied the ointment immediately before going on duty. Of the 42 men 36 remained entirely free from bites while the remaining 6 were bitten once each. A trial on 44 men of the coast guard service gave practically identical results, the corresponding numbers being 36 and 8 respectively. Of 25 Carabinieri all but one remained unbiten. An experiment on a much larger scale was made on 228 men of a territorial battalion. These men slept in quarters entirely unprotected from mosquitoes and suffered intensely from mosquito bites, their nights being described by the author as a continual torture. In this experiment protection during the night was aimed at. The relief experienced by the men was immediate and was freely testified to. Of the 228 56 were bitten once only in 15 nights, the other 172 escaping entirely.

F. S. A.

GEIGER (J. C.) & PURDY (W. C.). Experimental Mosquito Control in Ricefields.—*Jl. Amer. Med. Assoc.* 1919. Mch. 15 pp. 775-779. With 8 charts.

The authors, Assistant Epidemiologist and Plankton Expert in the U.S. Public Health Service, made the experiments here recorded to find out whether measures to control mosquitoes were practicable in the rice-fields of Arkansas. Fuel oil, "two-plus-one" oil mixture (2 of kerosine to 1 of black oil), top-minnows and intermittent flooding were tried in two rice-fields. The oils when delivered by a drip-can did not spread well owing to the rice stalks, but when oil-saturated sawdust (one bushel absorbing about 3 gallons of oil) was broadcast the results were quite good, offering "future hopes for ultimate mosquito control in rice-fields within reasonable flight distance of communities." The top-minnows showed a preference for the deeper water, but reduced the larvae considerably. Intermittent flooding

is not considered feasible, owing to "the additional cost of water," and the fact that the larvae continue to develop on the nearby fields into which they have been drained. The mosquitoes were *Anopheles* and *Culex* in about equal numbers.

A. G. B.

PARSONS (A. C.) & BROOK (G. R.). **The Mosquito Problem in Britain : Suggestions for a Winter Campaign against the Important Mosquitos, with Notes on Insecticides.**—*Jl. Roy. Army Med. Corps.* 1919. Jan. Vol. 32. No. 1. pp. 1-23

The winter habits of the commoner British mosquitoes are here discussed. It is noted that *Anopheles maculipennis* hibernate as adults and *A. bifurcatus* as larvae. It is concluded that campaigns against these species should be conducted in the winter. The bulk of the paper is occupied by descriptions of measures for catching and killing adult mosquitoes, the details of which are of practical value, and the respective merits of various fumigants are discussed.

A. G. B.

LACAZE (H.). **Note au sujet de l'hibernation des larves des moustiques en Macédoine.**—*Bull. Soc. Path. Exot.* 1918. Oct. Vol. 11. No. 8. pp. 729-730

In December 1917 in the thaw after a week of frost on the Vasilika plain the author collected, amongst other larvae, 11 of *Anopheles palestinensis*. This species can therefore hibernate in the larval form. Larvae were found also in wells where at the same period the temperature kept above freezing point; this, the author remarks, would favour the survival of larvae during the winter.

A. G. B.

KING (W. W.). **A Note on the Flight of Mosquitoes through Horizontal Water Pipes.**—*U.S. Public Health Rep.* 1919. Feb. 28. Vol. 34. No. 9. pp. 386-390. With 1 fig.

The observations here recorded were made by the author at his own residence in St Thomas, Virgin Islands, where the water-supply is rain collected in tanks. The chief points are summed up as follows —

"(a) Mosquitoes entered and left cisterns through unscreened perpendicular water-spouts 2½ and 3 inches in diameter and 14 and 10 feet high.

"(b) Mosquitoes did not enter cisterns through larger unscreened water-spouts when these pipes had a horizontal section from 12 to 32 feet long. No observations were obtained of a horizontal distance of less than 12 feet.

"(c) Mosquitoes bred in the cisterns and septic tank and having no other means of exit passed through horizontal pipes 4 and 5 inches in diameter for a distance of 191 feet in the longest instance, aided probably to a certain degree by air currents."

In the last case it is believed that the eggs were deposited in the water in "the bowls of the toilets" and flushed through the drains into the septic tank. The mosquitoes in the septic tank were probably *Culex quinquefasciatus* [*C. fatigans* of most authors]. It is concluded that it is unnecessary to screen pipes leading to cisterns where such pipes have a considerable horizontal section.

A. G. B.

LEGENDRE (Jean). Note sur les *Stegomyia* de Tamatave.—*C. R. Soc. Biol.* 1918. Oct. 12. Vol. 81 No. 16. pp 832-833

At Tamatave, the port on the east coast of Madagascar, *S. fasciata* larvae are found in the hollows of bamboos cut between the nodes, in hollows in the trunk of coconut palms caused by a beetle and in cavities in old mango trees to a considerable height, as well as in the usual places. This species and *S. scutellaris* are often found side by side. *Stegomyia* eggs are laid preferably in wooden receptacles whether natural or artificial. Hardly any other genus of mosquitoes is represented so that Tamatave would deserve the name of "*Stegomyia* ville" Cases formerly labelled malaria were probably *Stegomyia*-transmitted dengue.*

A. G. B.

SWELLENGREBEL (N. H.). Een opmerking over de terminologie bij de beschrijving van Anopheline larven. [Terminology in Description of Anopheline Larvae]—*Geneesk. Tijdschr. v. Nederl.-Indië* 1918. Vol. 58. No. 6. pp. 1010-1011.

The author publishes a table in which his own terminology of the various parts of the anopheline larva and that of MANGKOE WINOTO are printed in parallel columns.

A. G. B.

PARROT (L.). Répartition Géographique de *Phlebotomus minutus* var. *africanus* dans le département de Constantine.—*Bull. Soc. Path. Exot.* 1918. Nov. Vol. 11. No. 9 pp. 791-792.

The researches of the brothers SERGENT, LEMAIRE, and SENEVIET, have shewn that the *P. minutus* var. *africanus* is a probable carrier of the infection of oriental sore in Northern Africa.

The author gives a resumé of the distribution of these flies in the department of Constantine, Algeria.

(1) In the littoral area at Bone there were:

P. papatasi, 40 per cent.; *P. perniciosus*, 10 per cent.; *P. minutus* var. *africanus*, 50 per cent.;

(2) On the high plateau at Gambia:

P. papatasi, 45 per cent.; *P. perniciosus*, 30 per cent.; *P. minutus* var. *af.*, 25 per cent.;

(3) At MacMahon, the northern limit of the "Biskra" endemic centre of leishmaniasis, *P. papatasi*, 10 per cent.; *P. perniciosus*, 60 per cent.; *P. minutus* var. *africanus*, 10 per cent.; *P. Sergenti* Parrot, 20 per cent.

In the Sahara at Barika there were, *P. papatasi*, 25 per cent.; *P. perniciosus*, 5 per cent.; *P. minutus* var. *africanus*, 70 per cent.

Thus the frequency of distribution of *P. minutus* var. *africanus* seems to vary very largely, 70 per cent. at Barika to 10 per cent. at MacMahon.

* In 1911 LEGENDRE in a paper entitled "Dengue et *Stegomyia*" [*Bull. Soc. Path. Exot.* Vol. 4. p. 26] argued that dengue at Hanoi must be so transmitted owing to the great multiplication of these mosquitoes during the epidemic and the rarity of other Culicines, to the cessation of the epidemic in the cold season in which *Stegomyia* becomes rare whereas other Culicines multiply to the extent of becoming a plague and, lastly, to the absence of other biting insects capable of such transmission.

These relative values appear to be of little definite use in etiological theories, as in the same locality within a few yards the same variation may exist.

The only definite conclusion to be drawn is that *P. minutus* var. *africanus* can be found in all parts of the department from the sea to the Sahara.

P. W. B.-S.

PARMAN (D. C.). Notes on *Phlebotomus* Species attacking Man.—*Jl. Econom. Entom.* 1919. Apl. Vol. 12. No. 2. pp. 211-213.

Phlebotomus (species not determined) was found to attack man in the autumn months of 1915-18 at Uvalde, Texas. Notes are given of their occurrence and habits. The bite was very painful. In 1916 and 1917 there was an outbreak of mild fever, termed by the local physician dengue, the fever lasted three days and the temperature reached 102-103°F

A. G. B.

CHARTER (H F) New West African *Ceratopogoninae*.—*Ann. Trop. Med. & Parasit.* 1919. Feb. 28 Vol. 12 Nos. 3 & 4. pp 289-302. With 1 plate & 4 figs

The species described are *Forcipomyia nigrum* sp. nov. and *Culicoides ochrothorax* sp. n. The first is of interest because under favourable conditions its larvae prey upon the larvae of mosquitoes breeding in rot-holes in trees, including *Stegomyia fasciata*. Both come from the Gold Coast.

A. G. B.

BOYÉ (Georges) & GUYOT (René). Contribution à la lutte contre les mouches.—*Bull. Acad. Méd.* 1919. Jan. 21. Vol. 81. 3 Ser. Year 83. No. 3. pp. 80-84.

The authors have tried a large number of substances for the destruction of flies and their larvae. The two which appeared most useful for fly destruction were cobold and castor oil. Cobold, or black arsenic, is said to be the foundation of most proprietary muscidicides. Castor oil has the advantage of non-toxicity to man; its action is increased by the addition of croton oil, 2 drops to 30 grammes

A. G. B.

STURTEVANT (A. H.). Flies of the Genus *Drosophila* as Possible Disease Carriers.—*Jl. Parasit.* 1918. Dec. Vol. 5. No. 2. pp. 84-85.

The species of *Drosophila* which the author regards as possible disease carriers are *D. repleta* Wollaston and *D. caribbea* Sturtevant. The former is common from Massachusetts to Brazil, is easily collected about dirty urinals and in kitchens or restaurants. It is most frequent near houses and in Cuba swarms where excrement is allowed to remain in any quantity. It breeds on fruit. *D. caribbea* is common in the American tropics and is often seen about excrement.

A. G. B.

JUNGMANN (Paul). *Untersuchungen über Schaflausrickettsien (Rickettsia melophagi Noeller)*. [Rickettsia of Sheep Ticks.]—*Deut. Med. Woch.* 1918. Dec 5 Vol. 44. No. 49 pp. 1346-1348.

The writer finds that Rickettsia-like organisms are normal and regular inhabitants of the intestinal tract of the sheep tick. These can be cultivated on the medium described. There are important differences between this organism and that found in *Ped. vestimentis*—

1. *Rickettsia melophagi* can be grown on a medium composed of sheep's blood-glucose-agar. Hitherto *Rickettsia Prowazeki* has resisted all attempts at growth on artificial media.

2. *Rickettsia Prowazeki* is an intra-cellular organism of the cells of the stomach. *R. melophagi* is extra-cellular as a rule.

3. *R. Prowazeki* is not an obligate louse parasite, but is probably taken up by the louse during suction from a typhus patient. On the other hand, *R. melophagi* is a regular intestinal parasite of the sheep-tick and is inherited by egg infection. Rickettsia infection of the sheep is not proved and is improbable.

H. F. Bellamy.

RIBEYRO (Ramón E.). *Un caso autentico de miasis vesical*. [An Authentic Case of Vesical Myiasis.]—*Crón. Méd.* 1915. Feb Vol. 32. No. 620. pp 25-31. With 4 figs.

A case of myiasis of the bladder, being, according to the author, only the eighth on record.

The patient was a young man of dissolute habits who was the subject of a gonorrhoeal discharge. On one occasion, when passing water, he was conscious of a burning sensation in the urethra, which was followed by the passage of two maggots. This phenomenon was repeated on several occasions during the next few days, and finally the author was able to secure the expulsion of urine containing maggots in his presence so as to leave no doubt of the genuineness of the case. In all 37 maggots were passed in the course of twelve days. The symptoms then ceased. The larvae, one of which is illustrated in a camera-lucida drawing, were identified as those of *Anthomyia canicularis* and it is suggested that the ova must have been deposited on the orifice of the urethra, while the patient was asleep and uncovered by bed clothes. The larvae would then hatch out in the course of a few hours, and would naturally ascend the urethra.

J. B. N.

DE ALMEIDA (Waldemar). *Novo caso de Echolakiasis com alteracoes psicicas*. [A Case of Nasal Myiasis with Mental Symptoms]—*Arch. Brasileiros de Med.* 1917 June. Vol. 7. No. 6. pp. 321-324. With 1 fig.

Report of the case of a negro woman, aged 12 years, who was an inmate of an asylum for the insane. It was noted that she was subject to periodical attacks of fever with epistaxis, during which living larvae were expelled from the nose. During these attacks the mental state altered considerably for the worse, the patient becoming excited and subject to delusions of various kinds. The original form of insanity was certified as "dementia praecox." Inhalations of chloroform and nasal douches of boric acid solution, caused the expulsion altogether of 167 larvae, after which apparently the patient returned to her previous mental state. The species of larvae is not stated.

J. B. N.

- ARCHIBALD (R. G.) & KING (Harold II.). A Note on the Occurrence of a Coleopterous Larva in the Urinary Tract of Man in the Anglo-Egyptian Sudan.—*Bull. Entom. Res.* 1919. Mch. Vol. 9 No. 3. pp. 255-256. With 2 figs.

A native of Mongalla Province suffered from debility, difficult and painful micturition and haematuria. Ova of *Schistosoma haematobium* were found in his urine. Later he had severe strangury and his urethra was washed out with a weak solution of permanganate of potassium, after which numerous Coleopterous larvae were passed, and again on the following day, when the symptoms were completely relieved. The beetle could not be determined.

A. G. B.

- ROUSSEAU (L.). Un cas de Parasitisme vulvo-vaginal par un Acarien Sarcopside au Cameroun.—*Bull. Soc. Path. Exot.* 1918. Oct. Vol. 11. No. 8. pp. 722-724

A native girl of three and a half was brought to the author at Duala suffering from frequency of micturition, vaginitis and local irritation. In the sediment from a sample of urine were found eggs, embryonic forms, a larva and three adult forms of an Acarian. Other forms of the parasite were found in the vaginal pus. It was a *Tyroglyphus*, according to TROUBESSART *T. sivo*. ROUBAUD pointed out that *T. longior* had been met with under similar conditions.

A. G. B.

- PLOTZ (Harry). The Importance of the Louse Problem.—*Jl. Amer. Med. Assoc.* 1919. Feb. 1. Vol. 72. No. 5. pp. 324-326. With 2 figs

Among "fundamental principles" in delousing the author defines it as that process which destroys lice and their eggs and the virus concerned in the transmission of disease. In all instances in which heat is used a high enough temperature must be employed to destroy the virus as well as lice and eggs. Steam is the best agent. He proceeds to describe the method by which the American army on its return is being deloused, with a plan of the plant.

A. G. B.

- MOORE (William). The Effect of Laundering Upon Lice (*Pediculus Corporis*) and Their Eggs.—*Jl. Parasit.* 1918. Dec. Vol. 5. No. 2. pp. 61-68.

The author goes into the subject of laundering in some detail and gives tables showing the temperatures reached at the various stages for cotton and woollen goods respectively. His experiments show that "the washing of rough cotton goods at 180° F. for 15 or 30 minutes will destroy the lice and their eggs. If by any chance an egg should escape destruction in the washing process they would later be destroyed during drying in the hot air tumbler." He recommends the following procedure for woollen goods:—

"Infested garments to be washed at a temperature of 120° F. (48.8° C.) not to fall below 115° F. (46.1° C.) during the washing period of 15 minutes, this treatment to destroy the active stages without the use of any special

chemicals. Garments are then treated in the regular manner until perfectly dry, when they should be placed in the hot air tumbler at a temperature of 150° to 170° F. (65.5° C. to 76.6° C.), for 10 to 15 minutes resulting in the destruction of the eggs. By this method, it will be possible to launder woollens without shrinkage, and destroy the lice and eggs without the use of a special chemical."

A. G. B.

FOSTER (M. H.). **Preliminary Report on Carbon Tetrachloride Vapor as a Delousing Agent**—*Public Health Rep* 1918. Oct 25 Vol 33. No. 43. pp 1823-1827.

Carbon tetrachloride is a heavy colourless fluid with a fruity odour and is used in proprietary cleansing fluids on account of its great power of dissolving fats. Its vapour extinguishes combustion. It appears to be very toxic for lice and flies. Experiments are described with the conclusion that "it will certainly prove to be a most efficient and convenient means of killing lice on the clothing of troops or civilians in places where recourse can not be had to more complicated methods, as all that is necessary in actual practice is to place the infested articles in the container, pour the required amount of carbon tetrachloride on the top layer, cover and allow the can to remain undisturbed for two hours, after which they are properly aired. . . . It is not contemplated to propose it as a substitute for the heat or cyanid gas treatments where these are available."

Little evidence was obtained of its effect on nits.

A. G. B.

i. MOORE (William). **An Interesting Reaction to Louse Bites** *Jl Amer. Med Assoc.* 1918. Nov. 2. Vol. 71 No. 18 pp. 1481-1482

ii. HIRSCHFELDER (Arthur D.) & MOORE (William). **Clinical Studies on the Effects of Louse Bites—*Pediculus Corporis***.—*Arch. Intern. Med.* 1919 Apr. 15 Vol. 23. No. 4. pp. 419-430 With 4 charts.

1. The author produces evidence from his own experience and that of his assistant that a person providing sustenance for large numbers of lice may get symptoms suggestive of trench fever, which symptoms he suggests may be due to toxins introduced with the act of feeding, and this may to some extent account for the symptomatology of trench fever. He started feeding on himself 700-800 lice twice a day. "Almost immediately a general tired feeling was noticed in the calf of the legs and along the shin bones, while on the soles of the feet and underneath the toes this tired feeling was so intense as often to prevent sleep until late in the night. An irritable and pessimistic state of mind developed." A fortnight later there was an illness similar to grippe with a rash like that of German measles. The author ceased to feed the lice but, after he resumed, the rash and symptoms returned, with severe headache, pain in shin, calf and sole, and intense pain in the joints. Renewed feeding was followed by a third attack, dissipated to a large extent by two days open air exercise.

ii. Four healthy young men were subjected to louse bites under definite conditions twice a day. In each, except one who had fed lice

on and off for over a year, there was a prompt rise of temperature ranging from 99.3° to 99.9° and later a well defined enlargement of the axillary glands both lasting for 5-6 days. One of the subjects after strenuous exercise had a second period of fever, of higher range. In 3 out of the 4 there was a "well defined rash" on the trunk "composed of semilunar and crescentic macules from 2 to 3 mm in size resembling those of fading measles or German measles." Blood cultures were negative. It is noted that the bodily vigour of all was impaired, and their efficiency lowered. The clinical observations are given in detail

A. G. B.

GROS (H) *Fréquence des porocéphales chez les noirs de l'Afrique occidentale.*—*Bull. Soc. Path. Exot.* 1919. Feb. Vol. 12 No. 2. pp. 92-93.

Among 62 autopsies made on West Africans in 1917-18 the larvae of *Porocephalus* were found three times. In each case two larvae were found in the liver, death was due to tuberculosis. The author remarks that in tuberculous livers these larvae may pass unnoticed, being mistaken for softened tubercular granulations. They are however easily enucleable and their section is not stained yellow like the softened hepatic tubercles. They present too the characteristic annulations.

A. G. B.

PATERSON (A. C.). *Tarantula and Scorpion Bites.*—*Jl. Roy. Nav. Med. Serv.* 1919. Jan. Vol. 5. No. 1. pp. 99-101.

The bites in question were seen by the author on the islands of the Aegean Sea. The spider, *Tarantula zycosa* [*Lycosa tarantula*], was common at harvest time and was often found on the old gnarled trunks of olive trees. Two cases of bite are described in each of which an urticarial rash completely covering the body, oedema of the eyelids and lips, severe headache, fever (101° and 100°) and constitutional disturbance resulted, a day later recovery was complete. In the first case the condition 20 minutes after the bite appeared alarming. [This is an addition to knowledge, for *Tarantula* bites, according to CASTELLANI and CHALMERS, do not cause general symptoms.] For scorpion "bites" the author injected morphia.

A. G. B.

HOPKINS (F. Gowland). *A Lecture on the Practical Importance of Vitamines.*—*Brit. Med. J.* 1919. Apl 26. pp. 507-510.

This lecture was delivered in the course of Imperial Studies Lectures on Physiology and National Needs at King's College, London. It touches on beriberi, rickets, scurvy, and malnutrition, and is well worth perusal.

A. G. B.

(UGLIELMETTI (J.), HOUSSAY (B. A.) & VACCAREZZA (R. F.). **Toxicidad del Chlorhidrato de Emetina.** [Toxicity of Emetine Hydrochloride] — *Revista Inst Bacteriolog.* Buenos Aires 1918. Jan Vol 1 No. 2 pp. 161-172

An account of an experimental investigation into the toxicity of emetine hydrochloride. The experiments were carried out on various animals and the authors summarise their conclusions as follows. —

The toxicity of hydrochloride of emetine is of three forms.

(a) Immediate. Death within 24 hours. Dose from 0.05-0.075 gm per kg. (dog), 0.15-0.2 (rabbit), to 0.2 (guinea pig, rat, cat, pigeon, frog, toad). These doses are the minimal that kill without fail, not the smallest that may kill occasionally.

(b) Mediate. Death within 7-12 days after injection.

(c) Cumulative. Prolonged daily subcutaneous administration to dogs of a dose equal to the tenth part of that which kills within 24 hours may kill after an indeterminate period.

In the adult human subject the figure for immediate or massive toxicity is not known. Fatal results are to be feared, however, with doses from 6 gm. upwards and a dose of 1.2 gm. given at once is probably a mortal one. The intravenous method is not permissible. Cumulative toxicity in the human subject is well established. It is advisable not to inject 15 gm. on more than 4, 10 gm. on more than 6-7 nor 0.5 on more than 10-12 consecutive days. There should be long intervals between the series.

F. S. A.

SAVIGNAC (Roger) & AUVISATOS (André). **Un cas d'intolérance à l'émétine se manifestant par des poussées d'urticaire.** Contribution à l'étude de l'élimination de l'émétine. — *Bull et Mém Soc Méd Hôp de Paris.* 1919. Mch 13. Vol. 35. No. 9-10 pp. 211-216

A man with amoebic dysentery received between July and December four series of six injections of 0.4 gms. of emetine hydrochloride (a total of just under 1 gm.) without mishap. In January in the course of a fifth series he had urticaria, and during another series large prurigenous plaques lasting for a month after the last injection and not finally disappearing for five months. The plaques were fugitive, individual ones lasting perhaps a day. The urine was examined for emetine with results shown in a table. Emetine was found at intervals up to three months after the last injection; later it was not looked for. It is noted that MATTEI and RISON found emetine in the urine up to 60 days from the last injection [this *Bulletin*, Vol. 11, p. 228].

A. G. B.

FLU (P. C.), DE LANGEN (C. D.) & WRETHUIZEN (F.). **Recherches sur l'huile des espèces de *Chenopodium* cultivées à Java.** [Also in Dutch.] — *Meded Genesesk. Lab. te Weltevreden.* 1919. 3e Ser. A. No. 1. pp. 1-28.

The authors cultivated in Java two lots of seeds of *Chenopodium anthelminticum* and *C. ambrosioides*, which appear to be closely related (Linnaean) species, and from the seeds obtained extracted oil which

they tested first on dogs infected with *Ankylostoma caninum*, and then on infected men. The dogs were killed at known intervals after they had received their dose and the numbers and state of the ankylostomes were determined. A laxative was found necessary if the worms were to be expelled. The results are tabulated. One of the varieties grown in Java was found to be as effective, if not more so, than the commercial oil of American origin. A brief account is given of the treatment of 20 human cases.

A. G. B.

DE ASSIS IGLESIAS (F). *Sobre o vicio da diamba*.—*Ann. Paulist. Med. e Cirurg.* 1918. Dec. Vol. 9 No. 12 pp. 274-281. With 2 figs.

An account of the vice of hashish smoking as practised by negroes in the northern States of Brazil, principally Maranhão and Piahy. Diamba is a West African native name for the plant *Cannabis sativa* and the name and the practice of smoking the plant were introduced into Brazil by natives of Africa during the period of slavery. The author maintains that there is no specific difference between the *Cannabis indica* with which the name hashish is generally associated and the ordinary hemp plant or *Cannabis sativa* which is that smoked in north Brazil. The symptoms produced are those known to all who have read descriptions of the effects of hashish. When persisted in the vice of Diamba smoking leads to the complete intellectual and moral break up of its victims and finally to death. The article concludes with a list of eight authorities, six Portuguese and two French.

F. S. A.

UNGERMANN (E). *Züchtung der Weilschen Spirochaete, der Recurrens- und Hühnerspirochaete sowie Kulturversuche mit der Spirochaeta pallida und Trypanosomen*. [Cultivation of Weil's Spirochaete, Relapsing Fever and Fowl Spirochaetes, and Attempts to cultivate *Spirochaeta pallida* and Trypanosomes]—*Arb. a. d. Kaiserl. Gesundheits* 1918 Oct. Vol. 51. No. 1. pp. 114-158.

For the cultivation of spirochaetes sterile, freshly obtained serum, either undiluted or diluted with small quantities of normal saline or Ringer's fluid, is placed in suitable culture tubes and heated for 30 minutes at 58-60°; it is immediately covered with a layer of sterile paraffin and when sufficiently cool is inoculated. Rabbit serum was found to be best, and best of all, serum obtained from very young animals. The method has the great merit of simplicity. In this manner Weil's spirochaete was cultured for more than two years in 200 serum passages, the fowl spirochaete for 2 years in 140 passages, *S. obermeieri* for 7 months in 52 passages, and *S. duttoni* for 13 months in 80 passages; the relapsing fever spirochaetes retain their virulence.

Pathogenic trypanosomes were kept alive for 24 days, and often at first there was considerable multiplication, but never in sub-cultures. A temperature of 25-30° suited best.

A. G. B.

CHALMERS (A. J.) & ARCHIBALD (R. G.) A Peculiar Group of the
Coccaceae — *Jl Trop. Med & Hyg* 1919 March 15 Vol 22
No 6 pp 48-50

The authors have obtained from the human body diplococci, as well as short and long streptococcal chains, which contain Gram-positive and Gram-negative elements, and have illustrated an example from a case of cerebro-spinal meningitis [see this *Bulletin*, Vol. 9, p. 90]. These organisms have been found also in cases of tonsillitis and one of septicaemia. Their characters in each class of cases are tabulated. They clearly belong to the *Streptococcae* in ZOFFER's family *Coccaceae*. After discussing their position the authors made a new genus, *Janus*, thus described — "In chains, Gram-positive with Gram-negative elements in specimens taken direct from the human body during life and in pathological specimens obtained post mortem and in early cultures, without pigment formation, not forming zoogloea masses and not soluble in bile or salt solutions."

The position of the genus in the family is indicated in a diagnostic table. Three species are described, for one of which, *Janus crassus*, *Diplococcus crassus* von Lingelsheim 1906 is a synonym.

A. G. B.

TROPICAL DISEASES BUREAU.

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TROPICAL DISEASES
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MALARIA.

EDGAR (W. H.) On an Outbreak of Malaria.—*Jl. Roy Nav Med. Serv.* 1919. July. Vol. 5 No. 3. pp. 322-323.

A party of forty bluejackets and forty marines was landed from H M.S. "Talbot" at Quilmane in Portuguese East Africa and remained ashore for three days, being heavily bitten by mosquitoes while occupying trenches in low marshy ground. Subsequently sixteen of the party developed malaria, which in nine cases was definitely proved to be benign tertian in type. As there had been no malaria on the ship for some time previously and infection had evidently taken place at Quilmane it was possible to fix the incubation period definitely as a maximum period of twenty days and a minimum of twelve days. The author insists on the importance of the incubation period in influencing the routine use of quinine. He says: -

"Supposing it can be established that 'x' days elapse between the date of the infection and the completion of the cycle that culminated in an 'attack of fever,' it would be sufficient for preventive purposes to 'cinchonize' a man thoroughly once every 'x' days. I say 'cinchonize' because it is useless and illogical to give 5 grains of quinine to prevent disease which we know requires at least 30 grains a day to cure. It would be better both from a Service and medical point of view to give 10 grains three times a day for one or two days every 'x' days and so administer a knock-out blow to any parasites maturing in the blood. This scheme would have the additional advantage of avoiding the production of a quinine-tolerant strain of parasites which follows the daily taking of 5 grains and which is blamed for much of the quinine-resisting forms met with as a result of the campaign in Macedonia."

[He does not consider the action of prophylactic quinine on naked spores freshly introduced into the blood stream and its effects on the malarial parasite after the invasion of red cells.]

He speaks of the necessity of giving quinine until the early symptoms of cinchonism are present, considering that these should be the guide to treatment rather than any question of dosage, for the preparation of quinine used may be under strength or the absorption of the drug may be defective.

The marines suffered more heavily than the seamen, possibly because they wore "shorts" while the bluejackets had trousers and leggings.

The paper concludes with a note on "Price's Mosquito Deterrent" which is said to be only partially successful as a repellent but useful in allaying the irritation following mosquito bites

A. Balfour

HERMS (William B). Occurrence of Malaria and Anopheline Mosquitoes in Northern California.—*Public Health Reports*. 1919. July 18 Vol 34 No 29 pp 1579-1587.

This report shows that 58.7 per cent of the deaths from malaria occurring in California during the 10 years 1909 to 1918 occurred in the northern third of the State. The average annual mortality in these 10 years was 2.93 per 100,000 for the whole State, while for the northern third the figure was 3.7, or, excluding San Francisco (where only imported cases occur), it was 4.9 per 100,000. A marked decrease in the death rate from malaria has taken place during this 10 years period, viz, from 4.85 per 100,000 in 1909 to 1.79 in 1918.

It is observed that where anti-malarial work has been carried out, as at Placer County, Tehama, Sacramento, Butte, Yolo, and Yuba, a progressive reduction in case incidence (varying from 63 per cent, to 85 per cent) has been effected during the period 1914-1918 inclusive. On the other hand, where hitherto anti-malarial work has not been active the incidence is relatively high. A list of various counties giving their positions on the malarial incidence roster is given.

It is significant that more than 50 per cent of all the mosquitoes collected during the survey of northern California were taken in the three divisions (Sacramento Valley, Northern mountain and Sierra counties) where 80 per cent of all malaria has occurred. Fifty per cent of the mosquitoes captured were anophelines and 80 per cent of these were *A. quadrimaculatus* and *A. punctipennis*, both efficient carriers of malaria.

Anophelines occur much less abundantly in the coastal and inland coastal valley counties and *A. pseudopunctipennis* is the predominant species. Malaria is very rare in these counties, which suggests that this mosquito is either a weak carrier or inoperative. This conclusion is supported by numerous mosquito collections made in every coastal county to the Mexican border.

A. occidentalis (Dyar and Knab) is regarded for the purpose of this paper as a variety of *A. quadrimaculatus* and as regards the latter no differences were detected in the vast majority between those collected in California and those from the east. *A. occidentalis* is looked upon as a melanotic variety of *A. quadrimaculatus*.

A B

GRAY (Harold Farnsworth). The Cost of Malaria. A Study of Economic Loss sustained by the Anderson-Cottonwood Irrigation District, Shasta County, Calif.—*Jl. Amer. Med. Assoc.* 1919. May 24. Vol. 72. No. 21. pp. 1533-1535

This is a paper of a kind rarely coming under the reviewer's notice but which possesses a special value of its own although the details given have only a local interest. It is, however, instructive to note under what headings the author classes the causes of the economic loss due to malaria in an irrigation district such as the one he describes.

The three chief items are medicine, medical service, and labour loss, all of which it was possible to determine carefully, and presumably with considerable accuracy. The other factors, for which no accurate data were readily obtainable, may be classed as follows—

1. Deaths from malaria
2. Labour loss among casual labourers
3. Inability to handle crops at the proper time owing to malarial attacks
4. Losses on forced sales of property by people leaving the district on account of malaria
5. Losses due to vacant property.
6. Temporary removal of families from the district during the time of special malaria prevalence (the summer)
7. Loss due to depreciation of property values caused by the presence of malaria and mosquitoes

The inquiry was rendered necessary in order to prove or disprove the justification for imposing a tax for malaria control in addition to the already existing and heavy tax instituted for the construction of the irrigation system. The method of investigation is briefly described and the author's conclusion is that—

"Estimating a 50 per cent. reduction of malaria in the first year, 75 per cent. in the second, 90 per cent. in the third, and 95 per cent. in the fourth year (our experience in California has shown that this is readily possible), four years' work should eliminate, in savings, the cost of malaria due to the three items of medicine, medical service, and labour loss, and should show a considerable profit in other items, particularly in appreciation of property values."

A. B.

DE GUYON. *Répartition du paludisme dans les territoires de Gora, Verca et d'Opara (Basse-Albanie).*—*Bull. Soc. Path. Exot.* 1919. May 14. Vol. 12. No. 5. pp. 266-273.

A malarial survey has been carried out in Albanian territory recently acquired by the French as the result of their victorious campaign in that country. The investigation, which was begun in August 1918, determined in the first instance the spenic index of 36 villages. Children up to the age of ten were examined, the technique employed being that recommended by the brothers SERGENT.

The geographical features of the district are described, the endemic indices are stated in the form of a table and the distribution both of anophelines and of culicines is duly noted. The former comprise *A. maculipennis*, *bifurcatus* and *palestinensis*. The survey has shown that the higher altitudes are only slightly malarious but they lie between foci of infection and the nearer one approaches the latter, the higher is the endemic index.

Fortunately the region generally can easily be brought into a more healthy condition by training the mountain streams and draining the pools which form in their vicinity. Owing to the presence of anophelines at an altitude considerably over 3,000 feet (Glabrova-Chrétien) and their probable abundance at the time of the autumnal rains the author recommends for the troops stationed there a continuance of quinine prophylaxis and the use of mosquito nets until the first frosts.

A. B.

BOUFFARD (G.) Du paludisme au Dahomey.—*Bull. Soc. Path. Exot.* 1919. June 11. Vol. 12 No. 6 pp. 304-307.

The author gives a table showing the percentage of native children from 6 to 10 years of age (who were selected from out-patients at the hospital for minor surgical ailments) found to be harbouring malarial parasites. Benign parasites were apparently absent, quartan and malignant alone being found. The examination covered the period September 1916 to October 1917, and only some 15 to 20 children were examined each month.

From these data it appears that Dahomey should be classed as one of the least malarial colonies of that part of the world. The author, however, recognizes that the data collected are not sufficient upon which to base a satisfactory opinion and does not advise the omission of prophylactic measures as a result of the investigations.

There were no clinical features of interest amongst cases of the disease occurring in Europeans. Quinine in 1 gramme doses by injection for 3 days in succession has been the usual treatment and apparently this method of administration has been used in the case of children as young as one and a half months. Following the quinine injections the drug was given in doses of 5 cgm. ($\frac{3}{4}$ grain) in solution night and morning, and children so treated have made excellent recoveries. No relapses occurred after more than three months while this dosage was continued.

A. B.

LAMOUREUX (A.) & PORRY (Emile). L'index endémique du paludisme à la Martinique.—*Bull. Soc. Path. Exot.* 1919. June 11. Vol. 12 No. 6. pp. 301-304. With 1 map.

The authors describe the satisfactory condition of the island of Martinique from the malarial point of view. They point out that the examination of children in schools is liable to give an incorrect idea of the actual malarial index because (a) Sick children are not present in their classes, (b) Many of the school children attend from a distance, coming from the higher parts of the island where malaria is rare or absent, (c) Blood films are taken during the dry season (February, March) whereas it is during the hurricane or wet season (August, September) that cases of fever occur.

A. B.

JOB (E.) & HIRTZMANN (L.). Paludisme et infections typhoïdes.—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1919. June 12 Vol. 35. No. 19. pp. 581-585.

In this paper it is pointed out that the physician must be on the outlook for enterica and malaria occurring concurrently. Cases of this nature being found not to react to quinine have been wrongly regarded as malaria with quinine-resistant organisms. When quinine does not have the desired effect after three days' administration, the authors advocate blood culture for the enterica group of organisms. Illustrative cases are given.

Malaria occurring during convalescence from the typhoid diseases is also to be looked for and, if recognized, the prognosis is good with proper treatment.

B. paratyphosus B has been recovered from the blood during the course of malarial fevers without the bacillus having necessarily any pathogenetic effect

A. B.

WHITE (Marguerite) **Malaria from the Surgeon's Standpoint.**—*Lancet*. 1919. July 26 pp. 154-156.

This interesting communication draws attention to the protean nature of malaria and how it may simulate surgical conditions. In view of the considerable number of ex-soldiers who have suffered from the disease it is necessary for surgeons to be alive to its possibilities in this direction.

Amongst the surgical conditions quoted may be mentioned:
(a) Acute haemorrhagic pancreatitis due to malaria.

The patient, aged 26, had been invalided to Malta on account of malaria, having had three mild attacks (subtertian) during a six weeks' stay in hospital. On being sent to a convalescent camp his general health was excellent, but a few weeks later he was readmitted as a surgical case. Laparotomy disclosed some free bloody fluid in the abdomen, enlargement and congestion of the pancreas; small petechial haemorrhages and fat necrosis in the surrounding tissues and mesentery. Appendix normal, liver and spleen slightly enlarged and congested. The abdomen was closed without drainage, and intramuscular quinine grs. 10 administered. The patient collapsed twice after the operation but the following day was considerably improved. Thereafter, under quinine, recovery was uninterrupted.

The author also saw another similar case in Malta which quickly yielded to quinine.

(b) Pseudo-appendicitis. Many of these cases due to malaria and which cleared up rapidly under intramuscular quinine have been observed at Malta. It is considered that the pain on the right side is a referred pain due to acute splenitis, though it may be due to localization of the malarial parasite in the intestinal mucosa. The author has seen many cases of appendicitis, both catarrhal and suppurative, in malarial patients and the only point in differential diagnosis between "malarial appendicitis" and true appendicitis, as far as she could observe, was the white cell count. In pseudo-appendicitis or pseudo-cholecystitis due to malaria one finds leucopenia with a decrease in the polymorphs and a high mono-nuclear count. In true cases of appendicitis complicated with malaria one finds a relative leucocytosis with increase of polymorphs. The non-discovery of malarial parasites in the peripheral blood is of no account in the diagnosis.

(c) Malarial attacks following operations. It is latent malaria which is a most annoying but rarely fatal complication in surgical cases. [See this *Bulletin*, Vol. 4, p. 367.] The operation is the determining factor inducing an attack of malaria, which may often be foreshadowed by the following signs: severe pain in the wound, which itself looks unhealthy; joints often become swollen and exquisitely painful in a few hours the temperature from being

subnormal rises to 105° to 106° without a rigor. The impending malarial attack cannot be warded off by quinine at this stage but it may be shortened and a second attack is rare under quinine administered intramuscularly. Delayed wound healing is also observed. Some wounds may resemble syphilitic lesions and it is often only a negative Wassermann and the response to quinine treatment that demonstrates malaria as the cause. The author has never observed the above conditions in known treated cases of malaria. It is the latent untreated variety which gives rise to them. As a prophylactic against post-operative malaria 15 grs. quinine intramuscularly has proved extremely valuable.

(d) Camouflaged malaria, where all the symptoms indicated some other disease.

A further note tends to show that malaria may lie dormant for a period of two years, to be brought out again by some systemic shock. In the case quoted amputation of the leg was the determining factor. Acute dilatation of the heart is also very liable to occur in these cases during or after operation. Hence it is very necessary to choose carefully the anaesthetic employed. Ether is recommended, chloroform being considered absolutely contraindicated.

A. B.

GUBB (Alfred S.). **Accidental Transference of the Malarial Parasite in the Course of Transfusion.**—*Brit. Med. J.* 1919. July 19. pp. 74-75.

A soldier from Salonica, who had returned to Algiers, being dangerously ill with malignant malaria and suffering from intense anaemia, it was decided to transfuse. A sister who had never had malaria volunteered as donor of the blood, the operation being successfully performed on December 14th. On December 29th the sister was seized with a rigor, the temperature rising to 40.2° C. The attack was at first considered to be influenza as this was prevalent, but the periodicity of her temperature suggested malaria and a few days later *P. falciparum* was demonstrated in her blood.

In Algiers proper the disease is virtually unknown though it is common in the neighbouring districts. It was not the malarial season. The same type of plasmodium was found in both cases, and the incubation period is suggestive. It is thought therefore that infection was conveyed when, after isolating the patient's vein the surgeon proceeded to tap the donor's vein, or, when suturing the donor's arm after transfusion was completed.

A. B.

ROSS (Ronald) & JAMES (S. P.). **Suggestions for the Care of Malaria Patients.**—19 pp. 1919. London: H.M. Stationery Office. [Price 1d. net.]

A pamphlet compiled for the instruction of all medical officers and practitioners who have to attend cases of malaria amongst demobilised men, and intended also to further co-operation between practitioners.

treating patients, the Pensions Reterees and Medical Officers of Health. It contains a great deal of useful information in a small compass.

The medical man in charge of an ex-sailor or soldier suffering from malaria has to make certain that the diagnosis is correct, endeavour to cure the attack as quickly as possible and notify the case to the Medical Officer of Health of his District in accordance with the Malaria, etc., Regulations, 1919. This publication guides him in the performance of all these duties.

The diagnosis of malaria is briefly discussed, "benign" and "malignant" cases being clearly differentiated. The chief "pernicious" symptoms are duly listed and the symptoms of malarial cachexia described. Under the heading "Differential Diagnosis" there are useful clinical notes and special stress is laid on the close resemblance of intermittent fever to pulmonary tuberculosis and liver abscess. The type of malaria in which the daily febrile paroxysm comes on before mid-day is mentioned, a clinical sign which, it is said, renders a diagnosis of malaria moderately certain. Curiously enough, no allusion is made to the fact that malaria may very closely simulate enteric fever, though in a list of the diseases for which it has been mistaken in this country paratyphoid fever figures.

Diagnosis by blood examination is fully described and the limitations of the "therapeutic test" recorded.

The section dealing with treatment appears very sound, at least from the standpoint of the tropical practitioner. There is a foot-note to the effect that the taste of quinine is quickly removed by masticating a piece of bread, and the necessity for rest in bed at the commencement of treatment with quinine is duly insisted upon. Oral administration of the drug is recommended as a routine method but the indications both for intravenous and intramuscular injections are stated and the technique is described. Subcutaneous injection is condemned. [It was, however, successfully employed in the practice of one hospital on many occasions in German East Africa during the late campaign.]

Of special interest at the present time are the remarks on "After-treatment," especially as regards the taking of quinine. Four methods are described —

"(a) 10 grains of quinine once daily at dinner-time or at bed-time; or
"(b) 30 grains of quinine on each of two consecutive days, e.g. Saturday and Sunday each week; or

"(c) 30 grains of quinine every Sunday, the amount being taken in three doses of 10 grains each, the first in the early morning, the second at mid-day, and the third in the evening, or

"(d) 30 grains of quinine taken as in (c), but every tenth day instead of every Sunday"

The choice must depend on the circumstances and character of the individual case and is usually governed by the consideration as to which plan the patient is most likely to carry out conscientiously.

"It has been found that patients who carry on their usual employment while going through a course of after-treatment, especially if their duties involve regular work or exercise in the open air, do much better than those who are kept on the sick list for a considerable time after each relapse."

If relapse occurs or malaria parasites are found in the patient's blood he must go to bed and be treated as if his attack was a new infection.

WARD (G.), JAMIESON (T. H.); CORFIELD (C. R.) **A Criticism of the Memorandum on Malaria** [Correspondence]—*Lancet*. 1919
 July 19. pp. 126-127 Aug. 9 p. 266 Aug. 23. pp 349-350

WARD severely criticizes the Memorandum on Malaria [see above] He does so from the point of view of the general practitioner in this country and tabulates his criticisms as follows —

‘ (1) That the description of malaria given is not that of the form of malaria which will give us most trouble in the British Isles, and is, moreover, calculated rather to obscure than to elucidate the nature of the disease.

“ (2) That the methods of diagnosis on which most emphasis is laid are of little or no value to the practitioner in the British Isles, and that important methods of diagnosis have been omitted.

‘ (3) That the treatment suggested is not adapted to the class of case to be treated, is in part dangerous, and eris greatly in emphasising the value of quinine and excluding other factors necessary for recovery.”

He then proceeds to give reasons for his criticisms. He finds fault with the description of malaria because it is almost wholly devoted to the nature and periodicity of acute febrile attacks while the symptoms of the apyrexial period receive scanty attention. Thus, in his opinion, the Memorandum presents a false clinical picture of the course of the disease. He states that the condition of considerable splenomegaly and severe anaemia without serious symptoms or fever or emaciation, a condition described under the heading “Malarial Cachexia” in the Memorandum, is never seen in this country and he objects to the omission of all reference to those symptoms, such as chronic tachycardia, effort syndrome, etc., to which he has specially directed attention and which he thinks present the real difficulty in diagnosis when the question of pension has to be settled. [While Dr Ward has rendered a service in drawing attention to these conditions it is at least questionable if all of them are due to malaria. At any rate the matter seems to be one requiring further investigation.]

His objections to the methods of diagnosis are: that amongst clinical symptoms and signs periodic fever alone is mentioned, and it is the one sign of which the practitioner can scarcely hope to get accurate record; that under blood examination stress is laid only on the presence of parasites, and yet other blood-findings are of value [in this connection Dr. Ward mentions “pigment cells” (presumably cells containing malarial pigment), but it must be admitted that those are comparatively rarely found]; that the therapeutic test (quinine administration) should not have been advocated; and lastly, that mention of other useful means of diagnosis, such as hyperalgesic areas, herpes labialis, etc., has been omitted.

He considers the treatment advocated in the Memorandum is not adapted to the class of case to be treated and he stigmatizes intramuscular injection of quinine as dangerous [Properly employed, this is certainly not the case, as has been shown again and again in thousands of cases of malaria in all parts of the world.]

Finally, he considers that the general hygienic treatment of malaria has been neglected in the Memorandum, for he is of opinion that the most important principle in the treatment of malaria in pensioners is the improvement of the natural resistance of the body with the aid of as little quinine as possible.

[This trenchant letter has been considered in some detail for, though the reviewer does not agree with all Dr. Ward's arguments, it is clear that the Memorandum does not in every respect meet the needs of general practitioners in this country, a fact to be explained chiefly on account of the peculiar conditions which have arisen as the result of the war.]

JAMIESON protests against what he terms the pernicious and dangerous view of WARD as regards giving as little quinine as possible in the treatment of malaria in pensioners. He considers that inadequate quinine treatment accounts for the large number of malaria cases at present in hospital and is the cause in most cases of the signs on which WARD lays such stress.

He also repudiates the statement that the method of intramuscular injection is dangerous and cites his own experiences both at home and abroad in support of his contention.

CORFIELD, as the result of long experience in South Africa, supports some of WARD's contentions, pointing out that the symptoms of malaria in this country may be very different from what is seen in the tropics, more especially in cases which have been through a thorough course of hospital treatment and those which have become reacclimatized to home conditions.

In such cases it is the general constitutional disturbances, and more especially those referable to the nervous system, which render diagnosis difficult. He thinks the difficulties of diagnosis generally are not sufficiently emphasized in the Memorandum. With respect to treatment he agrees with what WARD says about the general and indiscriminate administration of quinine and opposes JAMIESON's view, stating that the danger to be guarded against is the failure to discontinue quinine in patients suffering from post-malarial conditions. For these he suggests the use of iron salts with arsenic, colloid preparations of iodides, organo-therapy, high frequency and other general measures.

A. B.

TANZER (Eimst) & OSTERWALD (H.) Ist mit einer weiteren Verbreitung der Malaria in Deutschland zu rechnen oder nicht? [Is a Further Spread of Malaria likely to occur in Germany or is it not?]*—Deut. Med. Woch.* 1919 June 19. Vol. 45. No. 25. pp. 689-690.

Owing to the demobilization of many men who have acquired malaria during the war there is a danger of the spread of the disease throughout Germany. The authors draw attention to the importance of this question, which they proceed to consider from two points of view, (1) as to whether in Germany anophelines seldom or never bite human beings, (2) whether anophelines have disappeared from dwelling-houses.

In considering the first proposition they quote a large number of authors and also some experiments of their own to show that both *Anopheles maculipennis* and *bifurcatus* do bite men in Germany. They point out, however, that in their experience, which is opposed

to that of several other observers, the immediate effects of the bite are very slight, the cutaneous irritation being insignificant.

With reference to the second proposition there seems clear evidence that, owing to the better sanitary condition of dwellings, anophelines in Germany have been largely relegated to cowsheds and stables, and especially to those which are dark, dirty and bedecked with spiders' webs.

[This is in accordance with what has been found in parts of England. *vide Transactions of the Society of Tropical Medicine & Hygiene*, Vol. 12, No. 3, Jan. 17, 1919.]

The authors refer to the now common practice of keeping goats, which PRELL considers may prove a danger, and mention that larvae and imagines of *A. maculipennis* have been found in large towns as well as in stables and sheds in their proximity. They conclude that the provision of light, airy and thoroughly clean stables and sheds is a very effective method of lessening the danger from anophelines.

A. B.

SILVESTRI (T.) [*Chinino, Malaria ed Influenza.*] *Riforma Medica*. Naples. 1919. May 17. Vol. 35. No. 20. p. 402.

The author asserts that the malaria rather than the quinine was responsible for malarial inmates of hospitals escaping influenza during the recent epidemic in Italy. Similarly any infectious disease seems to protect from influenza, but immunity to influenza ceases on recovery from the infectious disease. The systematic use of quinine as an influenza prophylactic does not seem effectual in preventing infection, but appears to have a pronounced attenuating influence on the course of the disease when it has developed. The same attenuating influence has been observed in scarlet fever and measles.

FERRER (R. Gómez). [*Malaria in Children.*] *Archivos Españoles de Pediatría*. 1919. March. Vol. 3. No. 3. p. 129. [Summarised in *Jl. Amer. Med. Assoc.* 1919. Aug. 2. p. 373.]

Malaria in children is liable to be misinterpreted. Any febrile process of an intermittent type should suggest possible malaria if the child has been in a malarial region or has been exposed to the risk of infection. Any suspicion of malaria either alone or in combination with another disease should be confirmed or refuted by laboratory diagnosis. As regards treatment a change in the salt of quinine employed sometimes proves useful. Subcutaneous [?intramuscular is possibly meant] injections may prove surprisingly successful, and the author states he would not hesitate to give the drug intravenously in case of need. If all else fails, change of climate, especially to an altitude of 3,000 feet or more, may save the child.

A. B.

SASSEN (Peter). Ueber die Methoden der Malariaprovokation. [Provocative Methods in Malaria.]—*Arch f. Schiffs- und Trop-Hyg* 1919. June Vol 23 No 12. pp. 235-253.

This lengthy paper is in the main a review of all the German literature on the subject of provocative agents in malaria, that is to say, agents employed either for diagnostic or therapeutic reasons in order to induce malarial relapse and to secure the reappearance of asexual malarial parasites in the peripheral blood.

The author begins by pointing out that most medical men during the war, being novices in tropical work, knew nothing of the provocative measures which had already been employed. He then proceeds to give examples of the earlier observations in which recrudescences of malaria with the appearance of parasites in the peripheral blood followed such procedures as the injection of tuberculin, the intramuscular injection of milk, anti-typhoid inoculation, and so forth.

He gives the following four essentials to which any such provocative agent must conform if it is to be really useful :—

1. It must be harmless
2. Its effect must not be merely accidental or due to outside causes.
3. The result of its use must not be long delayed
4. It must be cheap and, above all, practical.

Continuing, the author divides provocative agents into four groups, the first being those which may be classed as foreign proteins. As examples he cites the work of DRAGA on the injection of anti-typhoid serum and of milk and that of BRAUER with horse serum. Various other substances have been employed but in Sassen's opinion the best of this class is horse serum. He discourses to some extent on the action of such provocative agents but as we know very little about it and the views advanced are largely theoretical it is unnecessary to consider them in detail.

The second group comprises substances which exert their action on the circulation of the blood. There are various drugs of this nature as, for example, adrenalin, ergotin, the arsenical compounds arsazetin and salvarsan, also pilocarpin, strychnine, and pituitary extract. Certain disadvantages and even dangers attend the use of most of these substances. The best, according to Sassen, is adrenalin, the usual dose being 1 mgm. given subcutaneously. He states that it is not ideal, but it is the cheapest, most generally practical and most rapid in action. Sometimes unpleasant cardiac symptoms follow its use. It is believed that adrenalin acts as a provocative agent owing to the fact that by its action on the sympathetic nervous system it affects primarily the musculature of the smaller vessels in the splanchnic area, thereby leading to a rise of blood pressure. The vessels in this area therefore contract to a greater extent than those of the periphery and, as a result, the malarial parasites are expressed into the peripheral blood.

In the third group are found quinine and some haemolytic substances, such as lactic acid. In Italy quinine in small doses has been stated to be a provocative agent, but it would seem that it has to be given for a considerable time (4 weeks) before any result is apparent. A combination of quinine and glycerine is also said to be effective but it is possible the glycerine is the active agent. The author finds it

hard to understand how quinine in small doses acts but thinks it may be due to its stimulating action producing a greater motility in the young and half-grown malaria parasites.

Physical agents constitute the fourth group and amongst these Sassen cites ultraviolet rays hot and cold douches, hot packs and massage of the palpable spleen. He also mentions the methods employed by HOFFMANN, who dealt with 180 cases in 10 sanatoria. The first method consisted in the use of the hot air chamber at 55° C for 10 minutes, followed by cooling in a bath at 20° C for 3 minutes. In the second method faradization of the splenic area until the skin was well reddened, followed by muscular exercises, warm and cold douches and warm compresses to the spleen were employed.

Sassen discusses these various physical methods and describes the results obtained by them. He points out that ZIEHMANN has declared massage of the palpable spleen to be dangerous owing to the risk of rupture but considers that HOFFMANN's methods are worthy of a more extended trial.

He concludes that on the whole ultraviolet light and injection of adrenalin, perhaps in combination with harmless physical exercises, such as rowing, are the best provocative agents at present at our disposal. He thinks that we have little information as regards their value from a therapeutic standpoint but that as a means of diagnosis they are of distinct service.

A. B.

HENSZELMAN (Aladár) **Die Mobilisation der inaktiven Malaria und ein neues therapeutisches Hilfsmittel.** (Vorläufige Mitteilung.) [The Provocative Treatment of Latent Malaria and a New Therapeutic Agent.]—*Wien. Klin. Woch.* 1919. June 12. Vol. 32. No. 24. p. 636.

The author strongly recommends the use of small doses of Benzol (0.10 to 0.50 gm.) in gelatine capsules with oil as a provocative agent in latent malaria and also given along with quinine or neosalvarsan for the treatment of the cases when relapses occur. Although he has only treated six cases in this way the results have been so striking that he thinks they should be recorded. The effects of the benzol administration are evident after the lapse of four to six hours. He suggests that the drug precipitates relapse by causing the gametes to undergo a sporulation in the blood-forming organs whereby young schizonts appear in the blood, these being susceptible to quinine.

A. B.

SCHAEDEL (A.). **Biologische Betrachtungen zur Frage der Malaria-rezidive und der Malariaverbreitung.** [Biological Considerations on the Question of Malarial Relapses and Malarial Propagation.]—*Biol. Zentralbl.* 1918. Vol. 38. p. 143. [Summarised in *Arch. f. Schiff- u. Trop.-Hyg.* 1919. June. Vol. 23. No. 11. p. 228.]

Schaedel confirms the previous work of LENZ, for he has found in Mainz amongst 375 relapse cases of malaria (about 80 per cent. benign

and 20 per cent malignant tertian) occurring in soldiers during the years 1916 and 1917 that the relapse curve corresponds with the curve of the average year temperature. The higher the temperature, the greater the dryness of the air, the fewer the clouds, the more intensive the sunlight, the greater the number of relapses which occurred. The maximum relapse period was, however, in June, a month before the maximum temperature. Accepting SCHAUDINN'S theory of parthenogenesis of the gametes, Schaedel assumes that the greater the stimulus to the gametes the more quickly do relapses occur.

A. maculipennis is widely distributed throughout the whole Rhine region from Basle to Bingen, and *A. bifurcatus* also occurs. According to ZIEMANN although no anophelines have been found in the fortified area of Mainz they are common in the endemic malarial area of the Mainz basin. Schaedel believes that infection with *P. falciparum* cannot occur in Germany but MÜHLENS, who reviews his paper, points out that genuine cases have already occurred in France and Upper Silesia. MÜHLENS also finds himself unable to agree with another statement of Schaedel to the effect that the typical crescents disappear in a very short time, while the gametes of benign tertian malaria show themselves much more resistant.

A. B.

- ABRAMI (P.) & SENEVET (G.). i. Pathogénie de l'accès palustre. La crise hémoclasique initiale.—*Bull. et Mém. Soc. Méd. Hôpt. de Paris*. 1919. June 12. Vol. 35 No. 19. pp. 530-536.
 ii. Pathogénie de l'accès palustre. La crise hémoclasique. Causes et conséquences.—*Ibid.* pp. 537-544.

i The authors compare the similarity of the paroxysms of benign tertian malaria and that produced when a foreign substance (especially when of a colloidal nature) is rapidly injected intravenously. The clinical symptoms produced are so comparable in the two cases that the question arises as to the possibility of a similar determining factor being present.

The pathology of the phenomena following intravenous injections of foreign substances is nowadays well established. The results are specific. as, for instance, shock following peptone inoculation produces lowered arterial tension, leucopenia, conditions due to coagulation of the blood, and diminution in the number of red cells. Similarly anaphylactic shock has its own particular train of symptoms. Again one sees a specific reaction following the rapid injection of foreign colloidal substances, as after inoculation of sera, tissue extracts, white of egg and similar material. It has been shown by NOLF that the vascular shock simply represents the reaction of the blood-forming centres to the introduction of any antigen, following on the sudden disturbance set up in the colloidal equilibrium of the plasma.

For some years one of the authors has been associated with WIDAL and BRISSAUD in the study of these phenomena and they have given the name "Haemoclasis" to the symptoms, which present a larger signification than those following the group of antigen inoculations. They have observed that in no wise is the inoculation of foreign

albuminoid substances essential but that the same effect is produced by crystalline substances in solution which have been detoxicated, such as isotonic chloride or bicarbonate of soda, furthermore, these phenomena follow the influence of simple physical agents such as cold without the exhibition of any foreign substance. Haemoclasia is thus in reality a systemic condition independent of the nature of the determining substance, it produces a specialized plasmatic change, a disturbance of the colloidal equilibrium of the blood.

They have shown on the other hand that haemoclasia, far from constituting an experimental phenomenon, occurs in many pathological conditions and that research may produce the key to certain pathological puzzles. There can be little doubt that, apart from anaphylaxis, many pathological conditions have their origin in haemoclasia and research needs to be conducted on the disturbance of plasmal equilibrium.

Men and animals differ, in the latter this crisis is usually temporary with the clinical symptoms; in man, however, the haemoclasia which rapidly follows the injection of the provocative agent precedes, sometimes by some hours, the visible symptoms and the blood has already recovered its normal condition before the initial signs can be detected; there is no premonitory warning of the haemoclastic state.

The usual symptoms of haemoclasia are: Lowered arterial tension, leucopenia, alteration of the leucocyte count, diminution in the number of red cells, coagulation phenomena, lowering of the refractive index of the serum, i.e., symptoms similar to those already detailed for shock following peptone inoculation.

Benign malaria is a suitable disease to investigate and experience has confirmed the presence of this condition; the malarial paroxysm is preceded by a haemoclastic crisis having the main symptoms already enumerated. The haemoclasia is not evident; no feeling of illness, no rise of temperature indicates its occurrence, and by the time the cold stage sets in the blood has recovered its normal characteristics. Usually speaking, the blood changes precede the pyrexia by about from one to three hours; accordingly research must be conducted six to seven hours before the time of the expected attack if the phenomena are to be fully studied from their commencement. Investigations have brought to light the details, not only in malaria but also in paroxysmal haemoglobinuria, alimentary urticaria, asthma, and febrile crises following intravenous injections. One can observe the gradual diminution in numbers of the white and red blood cells, the inversion of the leucocyte count, the lowered arterial tension and increased coagulability of the blood.

In malaria leucopenia is extremely marked, the count falling to 5,000, 3,000, 2,000 or even 1,500. It usually lasts from three-quarters of an hour to an hour, rising frequently at the onset of the cold stage to 12,000 or 15,000. An example of the differential leucocyte count is given as follows:—

	Polynuclears.	Mononuclears.	Other forms.
Before the crisis ..	60	30	10
During the crisis ..	43	48	10
At the end of the crisis	60	30	10
At the onset of the cold stage	70	22	8

The following table gives in detail the phenomena observed

Time	Blood pressure.		Leucocytosis.	Differential leucocyte count		Red blood corpuscles	Coagulability.	Temperature.
	Max	Min		Polyu	Mon			
7.0	14.5	9	9,400	67	31	+++	18.5	36°9
7.15	14.5	9						
7.30	14	9	10,000					
7.50	13	9	6,000	62	36	++	12.0	36°9
8.0	12	8					6.5	
8.10	11	8	4,800	52	47	+		
8.20	11	8.5	3,000				7.0	
8.30	12	9	2,000	44	50	+		
8.40	14	9	2,600					
8.50	14.5	9	6,000	56	39	++	17.0	36°9 38°4
9.0	16	9	9,000					
9.15	15.5	9	11,000				18.5	
9.30	18	9	13,000	73	23	+++		
9.43	19.5	9	Onset of cold stage					

in In this paper some preliminary remarks are made on past conceptions as to the cause of the malarial paroxysm and the authors then explain the phenomena on their own observations and raise the question whether merozoites from rosettes, which are certainly colloidal in nature, may not play the part of foreign proteins. If one imagines a flood of merozoites of the same age suddenly set free in the blood plasma, in the bone marrow, in the liver, and in the spleen, it seems correct to look upon the rupture of the rosettes as analogous to an intravenous injection of an antigen and to find in it the determining cause of the haemoclastic crisis and of the febrile paroxysm which accompanies it. But a difficulty arises; the febrile paroxysm is simply the result of the haemoclastic crisis and follows it sometimes after an interval of one, two, or even five hours. If malarial haemoclasis is really provoked by the rapid liberation of merozoites, the stimulus should be chronologically immediately prior to the blood crisis, that is to say from 1 to 5 hours in advance of the cold stage. The latter has generally been considered as coincident with the rupture of rosettes, but as will be seen, this does not appear to be the case.

At first sight it would seem an easy matter to settle this point precisely, and that nothing would be more simple than to determine the actual moment of rosette disruption. In practice, however, causes of error and reasons for doubting observations are manifold. In the first place, the example is quoted of the numerous cases of severe and typical nature in which the blood examination for parasites is negative and the merozoites are accordingly set free at a time when they escape our powers of observation. Secondly, if one admits, as is very probable, that the evolution of the parasite occurs concurrently in the blood and in the blood-forming organs, it is constantly observed that the parasitic cycle is not a simple one. At a given moment one finds parasites of all ages present, young schizonts are

seen in the same preparation together with adult amoeboid forms, the mature state of division, and rosettes in various stages of development. It is possible that when these aberrant hatchings are too few in number no appreciable symptoms are manifest and that the haemoclastic shock and terminal pyrexial attack are obscured by a kind of spontaneous *skeptophylaxis**. Simultaneous and abundant hatchings will alone give rise to a malarial paroxysm.

In order to determine accurately the actual time at which rupture of rosettes occurs investigation was carried out on the following lines. Blood specimens from a sufficient number of cases were taken hour by hour before, during, and after the cold stage, commencing 7 to 10 hours before the expected time of, and continued for four hours after, the occurrence of the attack. The prevailing type of parasite, based on the enumeration of 200 plasmodia, was noted in the same manner as when making a differential leucocyte count. The parasites were classified according to their various stages of development.

It was found that the main rupture of rosettes occurred some hours preceding the cold stage, for, from one to two hours previously, a large and rapid increase of young schizonts was constantly observed. This increase is not a relative one; it is actual, as verified by the numerical relationship between them and the leucocytes. This sudden access of large numbers of merozoites into the blood plasma, due to rupture of mature rosettes; occurs therefore markedly in advance of the commencement of the cold stage and constantly corresponds in time to the beginning of the haemoclastic crisis.

The symptoms accompanying the malarial paroxysm, vomiting, diarrhoea, skin eruptions (urticaria, etc.), headache, backache, respiratory distress, etc., which formerly were attributed to malarial intoxication or to the localization of plasmodia in this or that situation are simply evidence, according to the authors, of the plasmatic disturbance which is haemoclasia. They have no hesitation in saying that the cold stage is nothing more than a manifestation of the haemoclastic shock, as "chill" in all degrees is a constant symptom of this state. If algid malaria is due to this cause one may hope to assist the patient by rapidly raising the arterial tension. One of the authors has shown the possibility of this by inoculation of 1,000 grammes of normal saline and 2 milligrammes of adrenalin, which dispelled all symptoms of collapse in a very few minutes. This practice enabled the observers to save 4 out of 6 bad cases, in two of which the signs of death had already been present more than 5 minutes. The inoculation was accompanied by artificial respiration. Similar cases of resurrection of the apparently dead have since been obtained by MONIER-VINARD. One can thus clearly understand why quinine, however it may be given, fails to arrest the malarial paroxysm when it is given during the cold stage; it is because the cause is already past, namely, the haemoclasia. One can also understand why quinine is of value when given 6 to 8 hours before the cold stage. It is not because, as used to be thought, the quinine has had time to be

* *Skeptophylaxis* = a condition in which a minute dose of a substance poisonous to animals will produce immediate temporary immunity to the action of the poison, although the blood of the animal may be highly toxic during that period of immunity.

absorbed, for we know absorption takes place with extreme rapidity ; the reason is because the haemoclastic shock due to the liberation of merozoites, has been checked.

The writers then proceeded to investigate the possibility of aborting the malarial paroxysm by a "previous" injection such as is employed to avert anaphylaxis (BESREDKA) In certain untreated cases of quotidian malaria they gave an intravenous injection of the patients' own serum eight hours before the expected attack. The serum was obtained from blood drawn the previous evening and allowed to coagulate at laboratory temperature. The dosage was 20 cubic centimetres. Six cases were so treated. In two of them the attacks came on in the usual way but were somewhat delayed, which suggested that inoculation had been given too far in advance of the commencement of haemoclasia. In three others the attacks supervened 5 to 7 hours after the injection and were mild. The cold stage was very slight, the temperature did not rise beyond 39.3° C., whereas on the evening before and the night previous it had been up to 40° , 40.7° and 40.4° . In the remaining case no paroxysm occurred. The patient remained well but fatigued 5 hours after the injection, with a slight headache. He had a temperature of 38.2° C for about 2 hours and 20 minutes ; there was no chill and no sweating.

These promising results merit further research on a large scale, for it is difficult to forecast precisely the commencement of the haemoclastic attack and so to know at what time the inoculation should be given

The authors are convinced that systematic research will result in the possibility of aborting haemoclasia in all classes of pyrexias such as occur in septic and pyaemic conditions, liver affections, kidney troubles and tuberculous lesions.

A. B.

NICOTRA (A.). *Intorno a un caso di malaria*. [Notes on a Case of Malaria]—*Ann. di Med. Nav. e Colon.* 1919. Mch.-Apl. (Year 25.) Vol. 1. No. 3-4. pp. 232-241.

A detailed account of a case of malaria in a soldier invalided from Albania. The patient was in an apparently desperate condition when he came under treatment. A blood examination led to a diagnosis of *Plasmodium praecox* as the organism present. The central nervous system bore the brunt of the disease, the symptoms closely resembling those of cerebral thrombosis. During the course of treatment the patient's condition appeared, several times, to be hopeless, but recovery eventually followed intravenous and intramuscular injections of quinine and a light bleeding, carried out when the danger from coma appeared at its greatest and followed by hypodermoclysis to restore the blood pressure.

F. S. Arnold.

PORAK (René). *Diagnostic du Paludisme*.—*Gaz. des Hôp.* 1919. June 14. Vol. 92. No. 36. pp. 553-556.

The first portion of a carefully written paper on the diagnosis of malaria, obviously designed to aid medical officers unfamiliar with the disease. After indicating the usual lines of inquiry in eliciting a history of malaria, the author briefly describes the symptoms, mentions

the therapeutic test, points out the forms of malaria which are known to be resistant to quinine, describes the laboratory findings and then devotes himself to a consideration of the differential diagnosis. There is, however, nothing in the paper which calls for special mention. It follows ground already well traversed. To judge from the references quoted the writer confined himself to a study of the French literature.

A. B.

MAYNE (Bruce). The Thick Blood Film Method for Malaria Diagnosis Applicable to Present Field Conditions.—*Public Health Rep.* 1919. Apl. 25. Vol. 34. No. 17. pp. 837-842. With 4 figs.

The author describes two methods of preparing the blood smear

1. Several drops of blood are "puddled" with a circular movement of the needle or the corner of a slide

2. The drops of blood are "dragged" sharply on the slide. The latter is merely a thin smear thickened.

More leucocytes are found in the puddle smear but the drag smear does not distort cells and parasites so much, is more uniform, permits a more rapid dehaemoglobinizing action of acid alcohol and stains more uniformly.

The general technique is given in some detail but all that need here be mentioned is the process followed when dehaemoglobinizing. Hydrochloric acid alcohol is employed and the alcohol should not be under 95 per cent. Two or three per cent. chemically pure hydrochloric acid in ordinary grain alcohol has given the best results.

The length of time required in the process depends on the thickness of the smear, the freshness of the specimen and the freshness of the acid alcohol used. To ensure good fixation 10 minutes' contact is required. A clear white film results. Wash in running water or in several changes of water for not more than five minutes and stain at once before the film has time to dry.

Notes on staining, slide-holders and the examination of the specimen follow but the only points meriting attention are the following:—

1. Precipitated stain is said to be best removed by first dipping the slide in water and then immersing in Wright's stain, which has also the effect of intensifying the colour of the cells.

2. As a rule, using the lowest power possible, both of ocular and objective, the majority of the parasites are discovered within 3 minutes. It is better not to fix a time limit but to count 100 fields in order to establish a negative finding. In the case of experienced workers 50 to 75 fields are sufficient. Only well stained fields should be thus registered.

3. It must be remembered that the gametocytes appear free of malarial pigment, which is dissolved by the acid alcohol.

4. It is an advantage to stain thick blood films as soon as possible. The results obtained with old smears are not satisfactory.

A. B.

TRÉMOLIÈRES (F.) & LÉOLERO (G.). [Réaction péritonéale aiguë au cours du Paludisme secondaire.]—*Paris Méd.* 1919. May 17. Vol. 9. No. 20. pp. 398-399.

While severe abdominal symptoms suggesting peritonitis have been described in connexion with primary malaria, the authors believe that

they have not hitherto been recorded in connexion with what the French writers call "paludisme secondaire." They therefore record a case with grave symptoms simulating perforation with peritonitis, but which rapidly recovered. The attack came on suddenly and was the first symptom of a malaria recrudescence which took place in France well-nigh a year after the first infection with malaria, which occurred in the East. After recovery from the peritoneal syndrome the patient had a number of malarial febrile attacks which eventually yielded to quinine. The abdominal symptoms were generalised but affected especially the right hypochondrium; the liver, and more particularly its quadrate lobe, being hypertrophied and painful. The authors attribute the attack entirely to malaria for there was nothing to indicate any lesion of an abdominal organ. Doubtless the facts that the patient was alcoholic and had also suffered from amoebic dysentery explained in some measure the localization and intensity of the attack. The authors caution surgeons against unjustifiable intervention in cases of this kind occurring along with secondary malaria.

[See also the paper by Marguerite WHITE reviewed in this number of the *Bulletin*]

A. B.

JONES (D. W. Carmalt). A Note on Segmental Hyperalgesia in Malaria.—*Lancet*. 1919. Aug. 16. p 283.

This note draws attention to the similarity of segmental hyperalgesia in malaria and trench fever. The author found hyperalgesic areas present in 70 per cent. of 120 malaria cases examined. He states that the only differences between these and those present in trench fever are the more frequent escape of the lumbrics in malaria and the consequent reduction in the number of cases of complete distribution.

A. B.

JOE (E.) & HIRTZMANN (L.). Paludisme et diarrhée.—*Bull. et Mém. Soc. Méd. Hôpit. de Paris*. 1919. July 2. Vol. 35. No. 22. pp 629-633.

The authors have studied the relations of malaria and diarrhoea both in Morocco and the East. They find that diarrhoea is frequent in cases of acute malaria and may assume various forms. The serous type of stool is usually bile-coloured but is sometimes blackish. Diarrhoea of this nature often disappears 24 to 48 hours after the commencement of quinine treatment. In other cases the stools are less frequent, are of soup-like consistence and may contain mucus or blood and mucus, the last-mentioned type resembling those seen in dysentery but differing from them to such an extent that they can be distinguished clinically, albeit it is advisable in all cases to obtain the aid of the laboratory.

[According to MANSON-BAHR true malarial dysentery has rather characteristic symptoms, these being a sudden onset accompanied by pyrexia, a rigor and it may be by vomiting. There are violent central abdominal pains and the stools are composed of blood clots and bright blood-stained mucus. The red blood cells are in rouleaux and columnar epithelial cells are present. Pus cells are absent.]

The French authors state that the inflammatory character of the stools is little in evidence in malarial dysentery, the clinical aspects of which are detailed in the accounts of two cases. In one of these, which proved fatal, the large intestine was found oedematous and much thickened but it was neither congested nor ulcerated. In another case, however, very tiny superficial erosions were present.

An interesting case is described in which apparently a pseudo-dysenteric crisis took the place of a primary malarial attack. Plasmodia were found both in the peripheral blood and in the blood of the dejecta.

There is also a form of diarrhoea associated with chronic malaria and distinct from the entero-colitis seen in malaria cachexia. It yields only to quinine. A case of this kind is described. Dysentery, both bacillary and amoebic, was excluded. There do not appear to have been any special features. It was merely a chronic diarrhoea with much mucus in the stools associated with wasting and occasional rise of temperature.

As regards the actual cause of these malarial diarrhoeas the authors suggest that the haematozoa may sometimes act directly on the intestinal mucosa, and at other times may produce the condition by their action on the liver, the pancreas or the abdominal nervous system.

In some instances malaria merely aggravates a pre-existing colitis.

A. B.

STEPHENS (J. W. W.), YORKE (W.), BLACKLOCK (B.), MACFIE (J. W. S.), COOPER (C. FORSTER) & CARTER (H. F.). Studies in the Treatment of Malaria. XXII. Intramuscular Injections of Quinine Bihydrochloride Grains 15 on each of Two Consecutive Days only, in Malignant Tertian Malaria. XXIII. Oral Administration of Quinine Sulphate Grains 30 on each of Two Consecutive Days weekly, over a Period of Five Weeks, in Malignant Tertian Malaria. XXIV. The Disappearance of Crescents under Quinine Treatment. XXV. Arsenic in Malignant Tertian Malaria.—*Ann Trop. Med. & Parasit.* 1919. May 12. Vol. 13. No 1. pp. 63-67. With 4 charts; 69-72; 73-74; 75-81. With 4 charts.

This paper is a further instalment of the useful observations carried out by the workers at the Liverpool School of Tropical Medicine.

XXII. They treated 29 cases and found that "an intramuscular injection of quinine bihydrochloride grains 15 in 2 cc. of water on each of two consecutive days only, causes the cessation of febrile paroxysms and effects the disappearance of trophozoites from the cutaneous blood in malignant tertian malaria." Relapse, however, occurs within three weeks, sometimes within a few days. The cases treated were all adult males infected either in West Africa or in Macedonia.

XXIII. The second lot of 18 cases were also all adult males and were infected in West Africa. Summarizing their results the authors state that

"As a palliative, quinine sulphate grains 30 on each of two consecutive days weekly, over a period of five weeks, suffices to keep the blood free from trophozoites and to prevent relapses in the great majority of cases. It is noteworthy that the percentage of cases having crescents in the peripheral blood diminishes each week, viz., from 50 per cent. in the first week to 6 per cent. in the fifth week of treatment."

XXIV The third group of 89 crescent cases were divided into three classes which were treated respectively with 20, 30 and 45 grain daily doses of quinine sulphate given in solution orally. When 30 or 45 grains daily are given the crescents do not persist in the peripheral blood in the majority of cases longer than three weeks.

XXV. In the last series of observations 41 adult males infected with malignant tertian malaria either in Macedonia or West Africa were submitted either to a course of arsenic (novarsenobillon) alone or of arsenic combined with intramuscular injections of quinine bihydrochloride. Temperature charts of several of the cases are shown and the conclusions reached are that

"1. Novarsenobillon in the doses used is of no value in the treatment of malignant tertian malaria.

"2. A combination of arsenic (Novarsenobillon or Liquor arsenicalis) with quinine in the doses used is not more effective than quinine alone."

The doses of novarsenobillon were given intravenously. Each of the 14 cases treated with this drug alone received a single injection of from gramme 0.45 to gramme 0.9. Ten cases got novarsenobillon gramme 0.9 on the first day, 15 grains of quinine bihydrochloride intramuscularly on each of two consecutive days. A single case was given 15 grains of quinine bihydrochloride intramuscularly on each of two consecutive days, Liq. arsenicalis, 30 minims by the mouth daily for eighteen days. Sixteen cases received Liq. arsenicalis, minims 30 by the mouth daily for 16 days together with 15 grains of quinine bihydrochloride intramuscularly on the first, second, eighth, ninth, fifteenth and sixteenth days.

A. B.

BRUNS (O.). Ueber die Mazedonische Malaria und ihre Behandlung. [Macedonian Malaria and its Treatment.]—*Münch. Med. Woch.* 1919 June 20. Vol. 66. No. 25. pp. 684-687.

This is a record of experiences with 600-700 cases of malaria in which the infection had been contracted in Macedonia. It was found that in the spring of 1918 these cases showed exclusively large benign tertian rings and gametes [gametocytes].* In the autumn the small rings of tropical malaria, together with crescents, became more and more in evidence. Daily quinine prophylaxis of 0.3 to 0.6 gm. hindered the development of plasmodia and thereby suppressed the symptoms of the disease but failed to prevent infection. Latent infections were frequent and slight attacks of malaria were often overlooked or attributed to other causes. Relapse cases were common, owing to the cessation of quinine prophylaxis. A very common exciting cause was the differences in atmospheric pressure experienced in the Vosges mountains where the hospital in which the cases were treated was situated. These and other causes upset the balance which existed in the latent period between the protective substances produced by the parasites and the malarial toxin. As a consequence, the author believes that the gametes take on a so-called parthenogenetic action which results in an active schizogony. [In this respect he follows the teachings of SCHAUDINN which were, however, probably erroneous (see this *Bulletin*, Vol. 11, p. 1.)]

* The use of the term gametes, as employed in this and many other papers, is zoologically incorrect but is very frequent in medical literature.

In doubtful cases he relied chiefly on blood examination by the thick drop method and the demonstration of changes in the red cells, i.e., basophilia and polychromatophilia, and mononucleosis of over 5 per cent. The demonstration of urobilin in the urine also proved helpful. He soon gave up provocative methods with adrenalin serum, small doses of quinine (Cori), etc. and considers the last-named useless. It leads only to immunization of the asexual forms and to increased gamete formation. Treatment was not begun when no plasmodia were found in the peripheral blood and there was no fever, even if mononucleosis and basophilia were present. Such cases were kept on full duty and not treated until plasmodia appeared and febrile relapses occurred.

The author also disapproves of provocative treatment for diagnostic purposes because he found that patients were often kept for weeks in hospital before an effective method was found.

Apart from Cori's procedure, provocative measures for therapeutic purposes have the following disadvantage. As the young forms susceptible to quinine are only found in the peripheral blood for a comparatively short time it is possible that before quinine can be administered they may have reached the finer capillaries in the internal organs and proceeded to produce new resting forms. Hence the provocative action may only lead to a disturbance of the balance of nature and give an impetus to the formation of such resting forms.

Bruns's experiences with neosalvarsan go to show that it acts both as a provocative and a plasmodicidal agent. He gives illustrations showing its action in both these directions.

He states that the cause of rigor and rise of temperature in malaria is not definitely known. It may be due to a toxin set free at the time the merozoites are discharged into the blood stream or possibly to a fever-producing substance formed in the red blood cells themselves.* According to BIEDL a fever attack only occurs when a sufficient number of ripe gametes appear in the blood at the same time as schizonts. There is, however, no relationship between the number of parasites in the peripheral blood and the onset or height of the fever. There may be fever without parasites and parasites without fever. Plasmodia may appear for the first time two or three days after a malarial attack.

As regards the periodicity of the attacks Bruns noted that the majority of relapses occurred at intervals of 9 days or multiples of 9, although this clinical picture was often altered owing to double infection or external influences. It would seem that this periodicity is to be explained in terms of gamete formation.

After this lengthy introduction Bruns proceeds to detail the routine treatment he employed, which in many cases was begun as soon as parasites were found. This is better than waiting for a clinical relapse to occur, but his convalescent cases had to be employed in certain building operations and so were frequently seized with the preliminary symptoms of a malarial attack.

The treatment consisted of quinine urethane intravenously, followed by quinine by mouth for varying periods throughout a course

*See, however, the paper by ABRAMI & SEVENET reviewed in this number of the *Bulletin*.

which lasted five weeks, injections of salvarsan or neosalvarsan being interspersed.

General measures directed to improving the health are of the utmost importance. On the days when injections are given there should be complete rest in bed; on the other days the patients should remain in a recumbent posture and throughout the treatment should undergo as little exertion as possible. Indeed the author's motto is "Let sleeping dogs lie," as he does not believe in the value of provocative methods. He states that one cannot expect to bring about a complete cure but must aim at establishing a condition of prolonged latency which will enable the patients to resume their duties in the field. It was found that though cases which he had treated might relapse, such relapses yielded readily to a 3 days' treatment and the patient had rarely to return to hospital. From the time of any such relapse a quinine prophylaxis of 1.5 to 2 gms. twice weekly must be carried out for at least 3 months.

In cases not finally cured Bruns recommends a 5 weeks' course according to his method once or twice a year for the first 3 years following infection, on the same lines as is now adopted in the treatment of syphilis.

A. B.

LÖWENSTEIN (E.). Bericht über die Resultate der parenteralen Chininbehandlung an 1400 Fällen bei Malaria tropica. II. Mitteilung. [Report on the Results of the Parenteral (Subcutaneous, Intramuscular and Intravenous) Quinine Treatment of 1400 Cases of Tropical Malaria.]—*Cent. f. Bakt.* 1. Abt. Orig. 1919. July 23. Vol. 83. No. 4. pp. 333-344.

After some preliminary remarks on the reasons for quinine taken by the mouth failing to act in tropical malaria the author states that he used the intravenous method in three classes of case:—

(1) those exhibiting coma; (2) those in which the fever failed to yield to oral quinine after fourteen days, (3) those which would not or could not take quinine by the mouth.

He thinks there are no contraindications to its use, as he has not observed any aggravation of the symptoms, even in cases of heart disease and nephritis, while in comatose malaria the intravenous method is the only one which affords any chance of cure.

Examples are given of the severe types of cases treated, and especially of those suffering from coma. In one case, which recovered, the coma lasted seven days. Other cases exhibited marked convulsions resembling epileptic fits and in yet others choleraic and dysenteric symptoms were prominent.

Renal complications were very frequent but out of 4,000 cases observed there was only one of haemoglobinuria, and that of moderate severity. Instances of venous thrombosis and of splenomegaly were observed and special note is made of a painful condition in the tibia, which disappeared under treatment with quinine.

As regards technique the hydrochloride of quinine was used dissolved in distilled water at body temperature. It was found that in physiological salt solution the quinine precipitated. Quinine urethane was

found to keep in solution, but unless 50 gms. of urethane were used to every 100 of quinine the latter precipitated out on the solution becoming cold.

A dose of 1 gm. of quinine was found to give rise to alarming symptoms, which quickly passed off. As, however, the use of this quantity did not sterilize the patient it was abandoned and a dose of from 0.5 to 0.6 gm. once daily was employed. In very severe cases with coma it was customary to give twice daily a dose of 0.5 gm. combined with adrenalin.

In a great number of cases 10-15 injections were found to free the blood of parasites, but in 73 cases the latter persisted even after 20-25 injections. The author remarks that it is possible that some which were rendered negative relapsed at a later date as it was impossible to keep in touch with the patients. He also notes how difficult it is in tropical malaria to be certain from the clinical sign alone whether a case is or is not cured. It is necessary to make at least three blood examinations before one can declare the patient free of parasites.

Löwenstein refers to a previous paper in which he showed that *in vitro* quinine in a concentration of 0.01 per cent. after three hours produced a coagulation of the plasma of the crescents. [See this *Bulletin*, Vol. 12, p. 53.] ZIEMANN agrees that the plasma is the part of the parasite attacked by the quinine, but does not think that this constitutes the specific action of the drug in malaria. SCHAUDINN and others oppose this view, believing that the quinine destroys the chromatin of the parasite. The matter, however, is a difficult one to decide as it is not easy to demonstrate quinine in the blood and therefore to say if such a high concentration as that above mentioned can be attained for a long time in the human organism or in the blood. The author quotes GRIEMSA and SCHAUDINN as showing how little of the actual alkaloids are present in the blood, even when a toxic dose is given, and the possibility that the malarial parasites are destroyed in the suprarenals where the quinine seems to accumulate to a much greater extent than in the blood.

Löwenstein has observed that after intravenous injection the asexual forms first disappear, followed by the female gametes, and that the male gametes are the least affected, a fact which he attributes to their being rich in chromatin substances, which he regards as being quinine-resistant.

He believes that the quinine acts in two ways, first, by direct chemical effect on the plasma of the parasites and, second, by an indirect mechanical stimulation of the unstriped musculature of the spleen. He thinks this last action is exemplified by cases with splenomegaly and showing only crescents or giving a negative blood test in which the effect of the first dose of quinine is to induce a return of small ring forms to the blood while the spleen diminishes remarkably in size. [This is analogous to the provocative action mentioned by SASSEN in a paper reviewed in this number of the *Bulletin*.] Its mode of action is considered as being really an example of fractional sterilization, for the quinine is able to deal with the successive broods of asexual forms appearing in the peripheral blood.

Löwenstein's observations go to show that intravenous administration should be limited to the types of cases which he first mentioned

and that it has no better therapeutic results than quinine given by the mouth, subcutaneously or intramuscularly.

He treated 12 cases with colloidal silver intravenously but found it had no effect either on the asexual or sexual forms and did not influence the course of the disease.

Proceeding, he quotes various German papers on the action of neosalvarsan and states that his own results with this agent have not been so good as those of NEUSCHLOSS. One case to which he gave 16 injections relapsed. It seems, however, capable of bringing about an afebrile period of from 3 to 6 days, which is doubtless of benefit in the case of those patients who have been running temperatures for a long time uninfluenced by quinine. Microscopically he finds that neosalvarsan temporarily drives the asexual forms out of the blood but has no effect upon the gametes, an observation confirmed by him *in vitro*.

In the second part of his communication the author states that quinine given by the intravenous method is excreted with extraordinary rapidity, the maximum point being reached after half an hour and the last trace of quinine being found nine hours after injection. The drug has actually been detected in the urine 10 minutes after administration. [See this *Bulletin*, Vol. 12, p. 48.]

The author finds that the excretion of quinine after intravenous injection reaches its maximum in 30 minutes, in subcutaneous injection after 2-3 hours, and after oral administration in 3-5 hours.

One advantage of the subcutaneous or intramuscular methods is that larger doses can safely be given. In order to do away with the possible risk of necrosis, and as urethane (which, according to GIEMSA, is an excellent quinine solvent) was not available in sufficient quantities, Löwenstein employed first alcohol and then ordinary glycerine for the purpose of making his solution of hydrochloride. He finds that glycerine is to be preferred and adds 25 cc. of a 10 per cent. quinine solution. He has employed this preparation in 10,000 injections with great success. Necrosis scarcely ever occurred and then only when very superficial injection was employed. He prefers the intramuscular to the subcutaneous method. He finds the best results are obtained with a daily dose of 1 gm.

In parenteral treatment with quinine, however, the excretion by the kidney alters, so that in cases previously treated by the intravenous, intramuscular or subcutaneous methods much less quinine is excreted than in those cases which have been previously treated *per os*. One finds that the amount is less, the duration of excretion is shorter and the maximum point of excretion is reached later; in other words, quinine habituation follows parenteral but not internal treatment.

The author finds that the intramuscular method gives the best results, especially in patients who, despite a careful quinine prophylaxis, have contracted malaria. At the same time he insists on the necessity for a thorough treatment, i.e., until all crescents have disappeared from the blood. As a rule this result will be achieved after 15-20 injections; the period between the injections must never be more than two days.

Speaking of quinine prophylaxis, Löwenstein states that he believes that observations on the excretion of quinine in the urine afford better information regarding its value than personal experiences with the

method. In view of the rapid excretion of quinine it is necessary that it should be taken prophylactically toward evening so that there may be a greater concentration in the blood at the time the sporozoites are likely to be introduced. He recommends that a daily dose be taken about 4 p.m., half a gramme being sufficient as the sporozoites are not very highly quinine-resistant.

Quinine-resistant strains have been recorded from countries in which quinine prophylaxis has been practised. More recently they have been reported by EUGLING in Albania.

Lowenstein concludes that evidence is not yet forthcoming to show whether there is a tolerance of the parasite to quinine or a tolerance of the human organism to quinine like that, for instance which occurs in the case of morphia and atropin.

A. B.

JAMIESON (T. H.). A Note on the Treatment of Malaria.—*Brit. Med. J.* 1919. June 14. p. 739

The author, who is the Medical Officer in charge of the Malaria Section of the 4th London General Hospital, considers that the frequency of relapse amongst demobilized men who have contracted malaria abroad is apparently due to civil practitioners fearing to give adequate doses of quinine. His experience shows that 10 grains of quinine sulphate in solution thrice daily never fails to cut short malarial attacks and banish the parasites from the peripheral blood. No ill effects follow such doses.

He recommends that each relapse should be treated by 30 grains of quinine daily for a week and that thereafter a 10 grain daily dose should be administered, according to the practice in vogue in the Malaria Concentration Centres in England.

A. B.

MARCHOUX (E.) Tous les alcaloïdes du quinquina possèdent la même action curative sur le paludisme.—*Bull. Soc. Path. Exot.* 1919. June 11 Vol 12 No 6. pp. 307-309.

The author states that the malarial plasmodium possesses a highly sensitive reaction which enables one to judge of the value of measures taken against it in about 6 hours' observation. Under the influence of quinine degenerative changes take place firstly in the nucleus, which divides and breaks up, and subsequently in the protoplasm, which shows marked and irregular amoeboid movement, then disintegrates and separates into independent masses which do not stain well and which may or may not be accompanied by nuclear chromatin. One can observe the above changes commencing one or two hours after the absorption of quinine and the process is very manifest 6 to 8 hours after exhibition of the drug. Simple microscopic examination is sufficient to decide very quickly on the activity of a drug and to judge as to its curative value. The cure of the paroxysm and disappearance of schizonts furnish the ultimate control. Of the three forms of fever it is always the benign tertian which is the most sensitive to the action of quinine and accordingly *P. vivax* is the most suitable parasite for test purposes in research of this nature. Reaction is

less clear in the quartan parasite and one cannot cut short the fever by the administration of one dose of quinine as is possible in the case of *P. vivax* infection. In malignant tertian it is very difficult indeed to interpret the reaction. A superficial observer would say that quinine was not acting because he continues to see gametes and schizonts. However, if one makes frequent examination it is clear that the schizonts are soon affected, i.e., in about 3-4 hours after absorption. It is accordingly the continuance of treatment rather than the dosage of quinine that is important to ensure cure; and the administration (in the more severe forms of fever) of quinine should continue for a long time, say a month at least, after disappearance of all gametes. A daily dose of 1 gramme (15 grs.) is sufficient provided it is divided into 4 doses and absorption is secured in the 24 hours.

References are given to various papers by GIEMSA and WERNER, BOURRU, MACGILCHRIST, etc., advocating various alkaloids of cinchona as being the most efficient, but the author is strongly of the opinion that either quinidine or cinchonine in doses of 1 gramme act on schizonts of *P. vivax*, destroying them 8 hours after absorption. Either one or the other, just like quinine, will check relapses. Hydroquinme [methyl-hydro-cupreine] and hydrocinchonine in doses of 1 gramme give the same results. One can destroy the schizonts of *P. vivax* with a single dose of 0.5 gramme of hydroquinme. In 1 gramme doses all the alkaloids of cinchona act as well as quinine.

A. B.

MCCARRISON (R.) & CORNWALL (J. W.). *Pharmaco-Dynamics of Quinine*.—*Indian Jl. Med. Res.* 1919. January. Vol. 6. No. 3. pp. 248-261. With 10 charts & 13 tracings.

This paper consists mainly of a series of charts and tracings illustrating the effect of intravenous injection of salts of quinine, with or without the addition of such substances as gum arabic in saline and adrenalin, on the arterial blood pressure of sheep. The tracings were taken under ether anaesthesia. The results are considered applicable to man, as is seen from the following conclusions.

"(1) The usual salts of quinine employed for intravenous medication are dangerous to life if given in large doses.

"(2) The respiratory centre is more gravely affected than the cardiac centre. The acid hydrobromide is less noxious in its action on the respiratory centre than the hydrochlorides of quinine.

"(3) All the salts of quinine employed caused a profound fall of blood-pressure not accompanied by a cessation, or even much diminution in the strength of the heart's beat, except in the two instances in which the respiratory centre failed (Nos. 21 and 22).

"(4) The fall of blood-pressure is usually recovered from in four or five minutes, but the period of cardiovascular depression may last for a considerable time.

"(5) The dilution of the quinine with a large volume of salt solution does not compensate for its depressor action: nor does dilution with 6 per cent. gum-arabic solution.

"(6) Intravenous injections of quinine should be given very slowly (Tracing No. 5). They should be administered with great caution when the general condition of the patient is bad and when the blood-pressure is low. All such injections should be controlled by blood-pressure observations.

(7) Adrenalin given intravenously with the quinine is able to counteract to some extent the immediate and dangerous fall of pressure which may result from quinine alone.

"We consider that the intravenous employment of quinine should be reserved for cases of special urgency, that where possible the hydrobromide in doses not exceeding 15 grains should be used and the injection combined with not more than 0.3 c.c. of the commercial solution of adrenalin in all cases where the blood-pressure is under 100 mm. of mercury. . . .

"We believe these experiments to indicate that quinine is a much more poisonous drug than is generally supposed, and that the massive dosage now-a-days so generally employed cannot fail to depress, by whatever route administered, the cardiovascular and respiratory systems, and to retard the development of that natural immunity on which the cure of the disease is dependent.

"We hold that quinine is a drug of the highest curative value in the treatment of malaria, but that it should be used only when the parasites, as indicated by blood examination, are susceptible to its action—that is, when in the stage of sporulation—and that it should be suspended in the intervals during which blood examination shows this stage to have been passed."

A. G. B.

- MONZIOLS & CASTEL. i. De l'emploi d'une huile quininisée, lipoidée, camphrée, comme méthode thérapeutique du paludisme grave.—*C.R. Soc. Biol.* 1919. May 24. Vol. 82. No. 15. pp. 550-552.
 ii. Trois cas d'accès pernicleux traités par la ponction lombaire et par l'injection intraveineuse d'huile quininisée, lipoidée, camphrée.—*Ibid.* pp. 552-555.

i In attempting to find a combination of quinine which, when used intravenously, would constitute a reservoir of the alkaloid and would not be speedily eliminated, the authors were led to combine oil of camphor, quinine and certain lipoids. They found oil of camphor useful in raising the blood pressure in a case of algid malaria and regard it as a suitable medium for the quinine and the lipoids. The latter were employed because it would seem that they are amongst the factors which are operative in the formation of those organic combinations in which quinine appears to exist in the circulating blood and, further, they seem to favour the intraglobular absorption of quinine, possibly by increasing the permeability of the red blood cells.

It is noteworthy that cholesterine, one of the lipoids, diminishes in quantity in the blood of severe cases of malaria. [It may be said that a lipid is "any one of a class of cell-components, other than liquid fats, which can be extracted with organic solvents like alcohol and ether." In addition to cholesterine the lipoids include lecithin, cephalin, protogen and jecorin.]

Each cubic centimetre of the oil which they prepared contains 5 centigrammes of quinine [salt not stated], 10 centigrammes of camphor and 5 centigrammes of lipoids.

ii. An account of three cases treated by the above combination. All were severe, the first presenting nervous symptoms like those of cerebro-spinal fever, the second suggesting a gastro-intestinal intoxication and the third exhibiting a marked meningitic syndrome. The dose of oil injected intravenously in each case was 2 cc. containing

10 centigrammes of quinine. In addition, 10 cc. of the oil were given intramuscularly and in two of the cases some quinine was given by the mouth. The quininised oil is stated to be quite harmless to man.

The results were highly satisfactory, the progress of the attacks being arrested and coma, present in two of the cases, abolished within 12 hours of the injection. Lumbar puncture was also practised and is said to have proved itself a very valuable auxiliary line of treatment.

A. B

TORO VILLA (G.). *Quinina*.—*Rev Clin.* Medellín. 1919 June.
Vol. 2. No. 13. pp. 20-32.

This lecture on quinine gives an account of the introduction of cinchona bark and the discovery of quinine, describes its local physiological action on the skin and mucous membranes and its general action on the alimentary, circulatory, nervous and genito-urinary systems, together with its effect on the blood and temperature and its special action on the parasites of malaria. A section is devoted to the consideration of the elimination of quinine. This begins and terminates more rapidly when the soluble salts are used and, other things being equal, is more rapid and intense the greater the quantity given. The amount eliminated is exactly proportional to the dose administered.

There are brief notes on the salts of quinine and the remainder of the paper is devoted to the methods of administration, the author giving details of his own practice, which has yielded satisfactory results.

During the apyrexial period he exhibits the following mixture

Sulphate of soda	30 grammes
Sulphate of quinine	2 "
Acidulated lemonade	150 "

The dose for vigorous patients who can easily tolerate quinine is 50 grammes with half an hour's interval between each dose, in exhausted individuals tablespoonfuls are given every hour.

Immediately thereafter cachets of 0.25 gramme of hydrochloride of quinine, each containing also 0.03 gramme of powdered opium, are administered one every six hours for a week.

During the following weeks, for a period of at least two months three days per week are devoted to the following treatment:—

A slight laxative on the morning of the first day and half a gramme of quinine hydrochloride at night and a similar dose of quinine on the evening of the second and third days.

In cases which are very anaemic or in which the infection is chronic and resistant a modification of Baccelli's formula is prescribed, two tablespoonfuls being given daily on the days of the week when the above mentioned quinine is not taken.

The author speaks well of Warburg's tincture in chronic malaria. Its drastic action, which makes it unsuitable for old and debilitated people, may be avoided by prescribing it without the aloes which forms one of its many ingredients.

In the case of children the quinine may be given with olive oil, which masks its taste. Mix in a mortar one gramme of the sulphate

with 5 grammes of the oil. Twenty drops of this emulsion contain 5 centigrammes of quinine and are administered in sweetened, cold milk.

A. B

PATRICK (Adam). **Experiences with Intravenous Injections of Quinine and Antimony in the Treatment of Malaria.**—*Jl. Roy. Army Med. Corps.* 1919. June Vol. 32. No. 6. pp. 407-429.

Captain Patrick refers to the employment of antimony in malaria by ROGERS and records his opinion that this line of treatment has sometimes been too precipitately regarded as a failure. He has given it an extended trial in Malta, treating cases from Salonika with intravenous injections of quinine bihydrochloride and antimony tartarate from February 1917 till July 1918. Both simple tertian and subtertian cases were treated, in the former an attempt being made to prevent relapses and in the latter to rid the peripheral blood of crescents.

Of the simple tertian infections 104 chronic relapsing cases were treated, 56 of which were of more than a year's standing. Fifty had had 30 or more relapses. The average number of relapses per patient had been twenty-five. Three intravenous injections of 15 grains of quinine bihydrochloride and five intravenous injections of antimony tartarate in doses up to 0.12 gramme were given on eight successive days in the first thirty cases. The remainder had quinine on the second, fourth and sixth days and antimony on the others. On the days on which antimony was injected 30 grains of quinine sulphate were given by the mouth.

The period of treatment and observation extended from June till December, 1917 and after the special treatment had been completed each patient had six grains of quinine daily by the mouth in order to comply with the rules laid down for the treatment of cases of malaria. The author does not think that this course of quinine could have had much effect in checking relapses.

About fifty-five per cent. of the 104 cases treated did not relapse. It was found difficult to define a relapse, as cases occurred which were termed by GARROD malarial *petit mal*. In such cases the temperature did not rise higher than 99° or 100° F. and frequently parasites could not be demonstrated in the blood. This led Patrick in estimating results to class as a malarial attack any pyrexia of 99° F. or over, accompanied or preceded by a rigor. He doubts, however, if these were really genuine attacks, for the number of negative films was remarkable. Tables are given showing the best and worst results from the treatment, but these need not be here reproduced. A few cases treated in the same way in the spring of 1918 yielded less satisfactory results, possibly because the malarial parasite is most active in the body during the spring season.

Some tertian cases were treated by antimony alone, apparently with benefit. It does not stop attacks, as does quinine, but it appears in some cases to abolish relapses and in others to modify attacks, so much so that the author believes it has some lasting effect on the plasmodium.

He speaks highly of the value of intravenous injections of quinine in pyrexial cases of subtertian malaria and gives the records of eight patients suffering from this form of malaria and treated by intravenous

injections of antimony, from which it would seem that the drug has some effect in destroying crescents. He thinks it merits further trial. The dose varied from 0.04 to 0.12 gramme.

A lengthy and careful account of the injection technique is given, concentrated solutions of quinine given from a Record syringe being recommended. A five per cent. solution of the bihydrochloride in distilled water, with 0.8 per cent of sodium chloride added, was employed. In the case of the antimony injections a 1 per cent. or a 2 per cent. solution of the tartrate in 0.85 per cent salt solution was used.

Three cases are cited which appeared to be examples of quinine precipitating an attack of blackwater fever and there are notes on gastro-intestinal and cutaneous susceptibility to the action of the drug. The general effects produced by antimony injections are also considered, but there is nothing new to record.

The following are the author's conclusions:—

(1) Of 104 patients with chronic relapsing tertian malaria, who were treated in 1917 with intravenous injections—three of quinine bihydrochloride, and five of antimony tartrate—fifty-five per cent. remained free from attack for three months or longer.

(2) A few cases treated similarly in the spring of 1918 gave much less favourable results.

(3) Intravenous injections of quinine will check any series of attacks but have not much effect in preventing relapses.

(4) Intravenous injections of antimony tartrate gradually exercise a destructive influence on the parasite, and have an effect in preventing relapses.

(5) In cases of subtertian malaria the best treatment is by intravenous injections of quinine.

(6) Intravenous injections of antimony tartrate have some effect in causing crescents to disappear from the blood.

(7) For injections in a number of cases in succession, solutions which can be given from a syringe are the most useful. Such are a five per cent. solution of quinine bihydrochloride and a one per cent. solution of antimony tartrate. There are no serious objections to the use of such a concentrated solution of quinine."

[So far as the effect of antimony is concerned these conclusions are not in accord with those of other observers. See this *Bulletin*, Vol. 10, pp 166 and 167; Vol 11, p 301; Vol. 12, pp 56 and 57.]

A. B.

MILLER (Hugh) *The Treatment of Chronic Relapsing Malaria with Salvarsan Substitutes.—Jl. Roy. Army Med. Corps.* 1919. June. Vol. 32. No 6 pp. 483-486.

The investigations recorded in this short paper were carried out in Egypt on cases of chronic relapsing malaria, the majority of which had originally been infected in Macedonia. In order that the salvarsan substitutes should be thoroughly tested the most hopeless cases were selected, which had failed to react to quinine.

The following table shows the time that had elapsed between the original infection and the date when the cases came under observation.

More than 2 years	.. ..	14 per cent.
From 18 to 24 months	. . .	37 "
" 12 " 18 "	.. .	20 "
" 6 " 12 "	.. .	25 "
Under 6 months	..	4 "

Seventy-three cases underwent the full course of treatment, which consisted of intravenous injections of either kharsivan or arsenobillon, no difference being noted in the action of the two drugs.

Each patient received four injections at intervals of five days, the dose being 0.3, 0.4, 0.5 and 0.6 gramme respectively. The drug was given in half a pint of saline and each injection occupied about ten minutes.

Of the seventy-three cases, twenty-six relapsed, making the percentage of relapses thirty-five. The first twenty cases, however, did not receive the full doses, and if they are omitted the percentage works out at 26.4. Although this is a fairly high figure it should be remembered that the cases were very intractable and the author states that the general improvement in the patients' condition was most remarkable. This is shown by the findings of a medical board at the convalescent camp to which most of the cases were ultimately sent. Only three of them were invalided to England. A point of some interest is that when the reaction after injection was severe, the result as regards relapse was better though, as the author says, this may have been merely a coincidence. He had one fatal case which developed acute toxic jaundice, but is unable to say whether this accident was due to the kharsivan having been adversely affected by the Egyptian climate or to some unknown cause. Other doses of the large batch employed produced no ill effects.

The chief points to note are that no case relapsed for 33 days from the time treatment was commenced though several were having daily rigors before it was instituted and while they were on quinine [dosage not stated], that the patients gained weight, lost their sallow appearance and generally felt much better.

The author admits that the number of cases is too small and the period under which they were under observation (two to three months after completion of treatment) too short to justify his making dogmatic statements as to ultimate results, but there was no doubt as to the benefits conferred by this line of treatment and he thinks it merits a fuller and more extended trial.

He states that if he had a further series of cases to treat he would follow the salvarsan course by one of quinine for two or three weeks and would extend the interval between the salvarsan injections to ten days or more, indeed to as long an interval as possible without allowing a relapse to occur.

A. B.

NEUMANN (W.). Zur Salvarsanbehandlung der Malaria. [Salvarsan Treatment of Malaria.]—*Deut. Med. Woch.* 1919. July 10. Vol. 45. No. 28. pp. 767-768. With 1 chart

The author points out that while the good results obtained by treatment with neosalvarsan in benign tertian malaria and its uselessness in tropical malaria are well known there are no observations as to its action in quartan malaria. Hence he gives a record of one case which came under his notice. At the outset this appeared to be a case of benign tertian malaria, which he treated by an injection of 0.45 gm. neosalvarsan. To his surprise the temperature was still elevated on the day following the injection. The explanation, according to Neumann, was forthcoming when, on examination of the

blood, although no benign tertian parasites were present as formerly, typical quartan parasites in the form of rings, bands and fully developed rosettes were present. He admits that one case is not much on which to found an opinion but suggests that quartan infection comes into the same category as malignant tertian, so far as the action of neosalvarsan is concerned.

A. B.

GROS (H.). *Le traitement du Paludisme par le trypanbleu.*—*Bull Soc. Path. Exot.* 1919. July. Vol. 12. No 7. pp. 434-442

The effect of trypanblue in human malaria was tested in view of its use by veterinary officers in protozoal diseases of animals. The author points out that the protozoa and the symptoms of bovine and human malaria differ considerably. [By bovine malaria is meant proplasmiasis.] He gives the dosage he utilized in human cases, and found that there were no untoward effects except in his first case (probably due to his not having filtered the stain immediately before subcutaneous injection). His conclusions are as follows --

(1) Trypanblue, in subcutaneous injections of 20 to 40 cc. of a 1 per cent solution caused a lowering of the fever due to malaria which had been in existence for about one month; (2) It does not hinder the multiplication of malarial organisms; (3) It does not produce as good a temporary sterilization as quinine, (4) It is markedly inferior to quinine and it should never be used alone in the treatment of malaria; (5) It can be employed without inconvenience and sometimes might be used with advantage together with quinine.

A. B.

MAYNE (Bruce). *The Occurrence of Malarial Parasites in Anopheles Crucians in Nature: Percentage of Infection of Anopheles Quadrimaculatus and Latest Date Found Infected in Louisiana.*—*Public Health Rep.* 1919. June 20. Vol. 34. No. 25. pp. 1355-1357.

A. crucians has been found infected in the wild state in northern Louisiana, the salivary glands being moderately infested with sporozoites, though the gut wall was negative as regards the presence of oocysts. This observation was made in the case of a single specimen, one out of 20 examined.

A. quadrimaculatus in the same locality has been found infected in 2.4 per cent. of those examined; and this ratio appears to be fairly constant.

A. B.

METZ (C. W.). *Anopheles Crucians* Wied. as an Agent in Malaria Transmission.—*Public Health Rep.* 1919. June 20. Vol. 34. No. 25. pp. 1357-1360.

Observations by Metz on the habits of *A. crucians* in Florida show that though apparently frequently found in privies, etc., it does not frequent actual dwelling-houses to any great extent; very much less so than *A. quadrimaculatus* when both species are present in a locality in approximately equal numbers. The percentage found

infected is given as 1·18 for *A. crucians* and 1·10 for *A. quadrimaculatus* and the infection of the former is light in comparison. *A. crucians* is probably an out-of-door biter in porches, outhouses, etc., and if this is the case screening of dwellings in localities infested by it will be comparatively unimportant unless other house-haunting species of anophelines are present in the locality

A. B.

BASS (C. C.). Studies on Malaria Control. III Observations on the Prevalence of Malaria, and its Control by treating Malaria Carriers, in a Locality of great Prevalence in the Mississippi Delta.—*Southern Med. J.* 1919. April. Vol 12. No 4 pp 190-193

Continuing his studies on malaria control Bass deals first with the prevalence of malaria in Bolivar and Sunflower Counties in the Mississippi delta, which is said certainly to approach 100 per cent. wherever the conditions are the most favourable. Although there seems to be great individual variation in susceptibility to infection Bass thinks it is possible and probable that nobody is absolutely immune under all circumstances and conditions. Surveys showed that in the Counties in question there was a prevalence of malaria of 50 per cent. of the total population; i.e., during a period of 12 months approximately 50 per cent. of all the population had malaria. The surveys included not only an historical inquiry but blood examination of a large number of cases, including those who gave negative histories.

Considering in the second place the question of control Bass records his belief that quinine, when taken properly for a sufficient length of time, will disinfect any person. As the result of two years' experience in Bolivar County more than 8,000 people in Sunflower County, occupying an area of 100 square miles, were, in 1918, placed upon a standard eight weeks' treatment with quinine [Although the author does not say so this standard treatment is probably that which he previously advocated as a six weeks' sterilizing course, i.e., thirty grains of quinine daily for three days, followed by thirty grains on the same day of the week on which the last of the three days fell, for the required period.]

A reduction of 88·82 per cent. in the prevalence of malaria was noted and the disease ceased to be an important factor in the health of the employees on many large plantations. In a sub-division of the area 440 persons were re-surveyed just one year from the date on which they were surveyed and put on treatment. This re-survey indicated a reduction of 89·9 per cent. over the frequency of malaria attacks during the year previous to their first survey and treatment.

The author states that the conclusion seems justified that it is practical to obtain a high degree of malaria control in localities of great prevalence in the Mississippi delta by proper treatment of malaria carriers.

[It may be so, it probably is so, but before accepting this conclusion one would have liked fuller information as to other factors which play a part in determining malaria prevalence and to have been assured that the physicians' reports on which the data were to some extent based were in all instances reliable and trustworthy.]

A. B.

BASS (C. C.). Studies on Malaria Control. V. The Importance of Disinfecting All Cases treated as a Factor in Malaria Control in a Locality of Great Prevalence.—*Southern Med J.* 1919. June. Vol 12 No 6. pp. 306-310. With 2 charts

It is pointed out that the thorough eradication of malaria in the patient is not only beneficial to the individual himself, but, where mosquitoes capable of passing on the infection exist, also to the community. Comparatively few cases of the disease are adequately treated to secure disinfection, in Sunflower City, Mississippi, in 1918, it was established that relapses occurred in from 50·7 per cent. to 68·8 per cent. of the cases, and it is considered that this percentage corresponds fairly well to what occurs in other malarious districts. A relapse case is a malaria carrier, and thorough disinfection will accordingly diminish the number of carriers and possibility of infection of anopheles.

Unfortunately a large proportion of cases of malaria do not come under treatment by a physician and accordingly disinfection is not carried out.

In 1916-1917 an investigation of 31,459 persons in Bolivar County was undertaken with the result that it was found that only one-fifth of those who had suffered from malaria or were found to be harbouring parasites had come under the care of a physician. Similarly in 1918 an investigation covering persons living in 100 square miles of country in Sunflower County gave one-fourth as having been under treatment by a medical man.

Supposing all cases treated by physicians were adequately disinfected, say 20 per cent. during a given year, the relapses that would occur during the following year would be reduced by 20 per cent, which itself would represent 10 per cent. of the total amount of malaria that would otherwise be expected to occur.

Furthermore by prevention of mosquito infection and transmission to new individuals the above would reduce the number of new cases of the disease by 10 per cent. That is to say, disinfection of 20 per cent. of the cases in any one year may be expected to reduce the number of cases (relapses and fresh infections) by 20 per cent. in the following year. In four years by this means alone malarial incidence might be reduced to 50 per cent. of what it was formerly, and by 90 per cent. in 10 years, as is shown in a graph

If so great a result would follow from such a comparatively simple procedure why do doctors fail to disinfect their malaria patients? The reasons given are (a) Spectacular Methods of Treatment, as, for example, intramuscular or intravenous injections where oral administration is sufficient to meet the case, or the employment of special forms of quinine. They may be the result of objections on the part of the patient to taking quinine by the mouth or be adopted possibly because some medical men desire to advertise their pleasant method of prescribing the drug. It is considered that those who employ these so-called spectacular methods will have few actual cures to their credit. (b) Not giving Patients Convincing Advice as to Treatment. The exhibition of quinine is not continued after the acute symptoms have gone or is carried out for too short a time. A patient rarely understands that malaria may be latent in his system after

the acute stage has passed. It is considered the minimum duration of treatment of all cases should be eight weeks, which should disinfect 90 per cent. of the cases. A dosage of about 10 grams daily for an adult and proportionately for children is considered sufficient. (c) Not employing efficient treatment, which is practically identical with what has been already said under (b). It is stated that no tonics or other drugs besides quinine have any specific action in the destruction of malaria parasites.

[The views above detailed are not likely to meet with general acceptance, especially in the light of what has occurred in connection with the late war.]

A. B.

BASS (C. C.). Studies on Malaria Control. IX. Effective and Practical Treatment of Malaria to disinfect Infected Persons and to prevent Relapse.—*Jl. Amer. Med. Assoc.* 1919. July 5. Vol. 73. No 1. pp. 21-23.

This paper embodies the arguments advanced in No. III of the author's Studies on Malaria Control (see above). In addition to what is there stated it may be noted that the 10 gram daily dose of quinine sulphate in tablet form which the author advocates should be given as one dose at night. He believes that only exceptional cases will fail to be disinfected by this line of treatment continued steadily for eight weeks. When such exceptional cases occur the period should be lengthened and success will eventually be obtained.

A discussion on the factors determining relapse followed the reading of the paper. Bass stated that we do not know exactly how cold and other influences which lower bodily vitality bring about relapses.

A. B.

LE PRINCE (J. A.). Mosquito Control about Cantonments and Shipyards.—*Public Health Rep.* 1919. Mar. 21. Vol. 34. No. 12. pp. 547-553.

This paper gives an account of anti-mosquito measures carried out along the Mississippi Gulf Coast. They varied in different localities. Perhaps the most interesting, because the most difficult, problem was that near Macon, Ga., where long ditches with little grade extended into a swamp. The ditches were deepened but after a certain point the pressure of the banks caused the bottom of the ditch to rise. Le Prince describes the method adopted to cope with this difficulty.

"Saplings were used and laid parallel to the banks as a ditch lining or wall to support the banks. Stakes were driven to hold the saplings in place and were then fastened back to living stumps or trees close to the ditch. Later, as the banks dried, the ditch was deepened. The banks became solid and the bottom held to grade. As the silt and mud in this swamp area were too soft to dig to advantage, a large part of the ditching was done by dynamite. Several weeks after the swamp was drained its bottom became very hard. In installing some of the ditches the semi liquid mud was so soft it could be bailed out. Before this work was started we were informed by the local authorities that the project was impossible and had a difficult time obtaining funds for its accomplishment.

Generally the results were good, leading both to a reduction in the number of anophelines and a remarkable reduction in the malaria sick rate of the civil population in and near the cantonment towns.

The work appears to have been well organized and well supported by the local civil authorities and by railroad corporations. Two of the author's concluding sentences may well be quoted. He says:—

"In certain instances where the town officials were under the impression that the expense of a mosquito drainage campaign would be beyond their financial ability, they were astounded to discover that the annual cost of screening houses and screen repairs greatly exceeded the cost of mosquito elimination. They did not realize the fact that it often costs a community, and the citizens of it personally, much more to support a mosquito nuisance than to eliminate it.

"The president of a large association of cotton-mill interests has stated that the elimination of mosquitoes near the mill properties has paid a higher return on the money expended than any other investment that the corporation has ever made."

'A. B.

EGYPTIAN GOVERNMENT. Preliminary Report of the Anti-Malarial Commission.—viii + 55 pp. With 7 plans. 1919. Cairo: Government Press.

The Egyptian Anti-Malarial Commission owed its origin to a letter sent by H.E. the High Commissioner to the Financial Adviser in December 1916. This letter drew attention to the large number of malaria-infected men brought into Egyptian hospitals from the Western Oases, Salonica and Mesopotamia and stated that the time appeared ripe for a thorough and systematic anti-mosquito campaign throughout Egypt.

The terms of reference were:—

"To consider and report upon what effective steps can be taken (a) before the next Nile flood; (b) subsequently, to destroy or reduce the numbers of fever-carrying mosquitoes in Egypt, more especially in highly populated centres."

No scientific investigation into malaria in Egypt was contemplated but rather a combined effort by the various Government Departments in the light of existing knowledge. Sub-Committees were formed which reported on the following matters:—

"(A) The measures necessary to deal with centres of malarial infection known to have existed in Egypt for a considerable time:—

(i) The Suez Canal district.

(ii) The various Oases.

"(B) The measures necessary to abolish mosquito breeding places in highly populated centres:—

(i) Cairo.

(ii) Alexandria.

(iii) The large towns of the Delta and El Fayûm.

"(C) The measures which might possibly be adopted in order to diminish the breeding of mosquitoes in agricultural areas.

"(D) Anti-malarial legislation."

Part II of this Report is concerned with the work and recommendations of these Sub-Committees while Part I contains the remarks of the Committee on this work and these recommendations, together with its own proposals to the Ministry of Finance.

After a short introduction on malaria generally the Committee points out that there is nothing to show that Egypt has ever been

generally infected with malaria but that the two factors, human and anopheline, on which the spread of malaria depends are gradually increasing

The increase of irrigation has resulted in larger areas being cultivated, especially with rice and other wet crops, while agricultural drainage works have not kept pace with this increase. Hence there are more anopheline breeding places

Improved means of communication have not only rendered Egypt more liable to infection from without but have facilitated movement within the country as from one possible malarial centre to another

Further, during the war numerous cases of malaria, and many of these of the malignant variety, have been introduced into Egypt while the railway connection with Palestine and the freer communication with all parts of the Turkish Empire and the East will facilitate importation of the disease.

The factors of temperature and the Nile flood are then discussed. The temperature conditions favourable for mosquito-breeding are practically confined to August, September and October while the increase in potential breeding places due to the Nile flood extends from August to December inclusive. Hence the actual breeding period is only three months.

If the Nile flood began in April instead of in August Egypt would very likely be a highly malarial country.

The anopheline breeding places are classified as follows —

“Desert water. Permanent marshes or lakes into which most of the arterial drains of the Delta flow. Badly aligned canals and drains, fostering vegetation; and dead-ends of canals. Borrow-pits. Outcrops of infiltration water.”

Basin irrigation is stated not to be dangerous because the water does not stand long enough to permit of the growth of vegetation. Moreover, fish, aquatic insects and wave action all act as mosquito deterrents.

The various breeding places are considered in detail, special attention being paid to infiltration water, which presents the greatest problem, a problem bound up with the movement of the sub-soil water, which requires further study. The subsidence of infiltration water is much more gradual than that of the Nile flood and large collections of it may remain for months several metres higher than the Nile in their close proximity. Happily, however, the flooding is of immediate danger only in districts where anophelines normally breed and which are already infected or likely to be infected with malaria. Hence general measures for the reduction or control of specially high Niles are not at present required. In any case large works are at present in progress or are projected both in Lower Egypt and the Sudan which will control high Niles and also improve drainage.

The committee consider that in dealing with subsoil water the following points should be borne in mind :—

“(i) That any general attempt on their part to deal with temporary infiltration water due to Nile floods is quite out of the question, general prevention being only gradually attainable by large undertakings; reference has been made to these.

“(ii) That the endeavours of the Commission to deal with it should be confined mainly to those local centres where endemic malaria is known to exist and where high floods aggravate the danger.

(iii) That, in addition, attention should be paid to certain areas, of which the Gezira and Giza districts of Cairo are good examples, where anophelines normally breed and which, although a few cases of local infection occur, cannot at present be considered as local endemic centres. Owing to the importance of these areas as centres of population and as places at which cases of malaria acquired elsewhere are liable to congregate, it is desirable that they should be dealt with separately."

These limitations being accepted the methods to be employed are filling-in and drainage. The former is so expensive that it is only suitable for small sites. The latter has been tried in two ways —

1. Lowering the general table of the sub-soil water.
2. Allowing the sub-soil water to attain its own level and then running it off from places where it appears into a system of drainage pipes.

In the case of building sites the first method can alone be used and instances are cited in which it has been successfully employed.

For cultivated land either system may be adopted and the best means of bringing them into operation are briefly discussed.

Under the heading "Present Measures and Future Developments" care is taken to point out that there is no question of forthwith abolishing all possible anopheline breeding places, which is impracticable. A cautious and to some extent Asquithian policy is advocated. The programme is to take certain precautionary measures now while the problem is of manageable proportions and then to wait and see and be guided by circumstances.

As a matter of fact a great deal has already been accomplished in certain localities, for example, the endemic centres in the Suez Canal Zone and Oases, as shown in the reports of the Sub-Committees, and the chief object to be secured is the protection of large centres of population, such as Cairo and eight large towns in the Delta.

The rural districts can for the present be largely neglected, for as a rule they are not subject to bulk infection by imported cases of malaria and, if they were dealt with, the preventive measures would have to be directed to improving drainage in order to counteract the increased irrigation supplies and flood infiltration. This necessitates large schemes which can only gradually be executed and in any case are already in hand for purely agricultural purposes.

An important recommendation deals with the prevention of new breeding places and it is satisfactory to note that the Committee include Government Departments amongst those who have to be watched and warned, and pay special attention to the risks accompanying railway development.

Part II of the Report is entitled Anti-malarial Measures in Specified Centres and Localities and hence has rather a local than general interest. To anyone familiar with Egypt, however, it affords most instructive reading and possibly cause for surprise in the amounts of money which have already been granted for or expended on anti-mosquito operations. These include £.E.10,000 for the Canal Zone, £.E.13,500 for the Provincial Towns and £.E.6,105 for Gezira South, near Cairo. (£.E. = £1. 0s. 6d.)

It is impossible in a review of this kind to enter as fully into details as one would like and as indeed this valuable report merits, but the Canal Zone is such an important international area that the following

remarks from a note by the Committee to the Ministry of Finance may well be quoted :—

‘ A number of factors combine to show that after the war the importance of the Canal Zone to Egypt will be increased to such a point as to render its freedom from malaria imperative

‘ (1) The development of the Eastern trade through Suez, consequent upon the changed conditions in the ports of the Red Sea and the Persian Gulf

“ (2) The development of a railway route across the land between Egypt and Palestine by means of El Aish Railway

“ (3) The probable increase in population of the Sinai Peninsula and the consequently greater communication with the Canal Zone by caravan routes

“ (4) The probable maintenance of a permanent garrison either at Quantara or at some other port upon the Canal.”

The work done at Kubri, Quantara, Ismailia and Suez, partly by the Army, partly by the Egyptian Government, is described.

As regards Ismailia it is said that “ about seven feddâns of the Abu Gamus swamp were filled in at the instance of the Commission. This completed certain filling in and drainage operations that had already been undertaken by the Government in 1915 ; about fifty feddâns have been brought under cultivation.” [Unfortunately, owing to lack of efficient supervision, this area had again become an anopheline nursery in the summer of 1916. At that time the reviewer made a survey of the area, found infiltration water present in the form of pools, the new irrigation channels blocked with vegetation and in many places harbouring anopheline larvae and much of the work which had been accomplished rendered of no avail. It is useless to fill up swamps if the native cultivator is afterwards allowed to do as he likes in the areas reclaimed. Constant inspection is required]

The notes on the conditions formerly present in the Western Oases, and especially in Kharga and Siwa, and the paragraphs dealing with rice cultivation are very interesting. So are the remarks on Cairo, Alexandria, and the Provincial Towns where, in addition to garden breeding places, the following are the most important nurseries of anophelines : “ railway borrow-pits, *birkas* [pools or ponds of infiltration water] and marshy land, low-lying land flooded at high Nile, rice fields, badly maintained drains, and drains with insufficient fall, collections of water due to seepage through canal banks, dead-ends of canals, and systems of watercourses receiving supply from more than one source.”

A section is devoted to the Agricultural Districts where the breeding places are classed as :—

“ Outcrops of subsoil or infiltration water. Lakes and marshes fed by waste water from drains and canals, and by infiltration water. Rice fields. Defective canals and drains.”

Rice apparently cannot be grown in Egypt under conditions which will not produce mosquitoes, but as drainage schemes progress its place is likely to be taken by more valuable crops such as cotton. At Kôm Ombo, an important agricultural area, the cultivation of sugar in large and unlevel fields necessitating the use of excessive quantities of water is held to be responsible for the prevalence of malaria. Some village spleen counts show a 25 per cent. infection, as high a ratio as the intensely infected oasis of Siwa. Further

information is needed regarding the association of malaria and sugar cultivation in Egypt.

There are useful Appendices, one dealing with Anti-Malarial Legislation and giving the lines along which a law should be drafted, and the Report is furnished with a good index, an excellent map of the Suez Canal Zone showing the anti-mosquito work, and several charts and plans

[As indicated, this is a very valuable publication and should be carefully studied by all interested in anti-malarial work in hot countries where the disease is present and where irrigation works are in vogue or are projected.]

A. B.

MORRIS (Leslie M.). **Practical Anti-Malaria Work in the Ægean, 1917-1918.**—*Jl. Roy. Nav. Med. Serv* 1919. July. Vol. 5. No. 3. pp 261-279. With 6 figs.

The first part of this interesting and well illustrated paper is concerned with successful anti-mosquito operations in Thasos, Kassandra, Stavros, Mitylene, Imbros and Syra. A good account of these is given but the only point which need here be noted is the observation regarding the flight of anophelines at Thasos. It was found that the distance traversed depended entirely on the wind and the nature of communications. Given a belt of olive trees and a steady prevailing night wind, anophelines covered one and a half miles.

Short accounts of quinine prophylaxis and treatment conclude the article. The author's experiences with quinine as a prophylactic were on the whole distinctly favourable. He thinks that, unless nets can be properly used every night and a successful anti-mosquito prophylaxis is in vogue, the drug should be given in solution, in intermittent lethal doses (30 grains every fifth day) in known malarial localities where infection is expected, and especially under service conditions. He recommends as a mosquito repellent the solid preparation, resembling a piece of Pears' soap, supplied by Price's Patent Candle Co. Its constitution is unknown

As regards treatment, which, so far as quinine was concerned, followed well-known lines, the author's experience of intramuscular injections was entirely favourable, but they are contraindicated in subjects of advanced debility with muscular wasting.

Arsenic was combined with the quinine during the second phase of treatment, i.e., when the fever had subsided and the patient was allowed to be out of bed, and proved beneficial. Arrhenal or Fowler's solution was employed.

A. B.

GRASSI (B.). **Assainissement Général, Prophylaxie. L'expérience de prophylaxie Antimalarique à Fiumicino.**—*Bull. Office Intern. d'Hyg. Publique.* 1919. June. Vol. 11. No. 6. pp. 592-608.

The experiences of the author in combating malaria by Ross's method at Fiumicino, part of the Commune of Rome, are not conclusive. The immediate results have not repaid the labour expended, in that a number of the inhabitants have suffered from malaria. Some

advantages gained were masked by influenza. However, the work carried out has not been wasted and perseverance will ultimately accomplish much.

While destruction of culicine mosquitoes is not a matter of difficulty that of anophelines is much greater than is usually imagined. Certain localities lend themselves to this latter and the breeding places therein, usually small in number, are the result of human agency. In the main, however, destruction of anophelines can only be secured by years of strenuous work. Local destruction alone is quite insufficient: for instance at Fiumicino it is necessary to extend operations to the whole of the malarial zone, which includes Porto, Maccarese, Ostia, Ponte Galeria and Magliana.

In many situations where anophelines were supposed to have been exterminated the author found them often in considerable numbers and malaria has not disappeared. If one wishes to gain real benefit the scheme must be one of magnitude, costing money, and affecting administrative departments such as those of Agriculture, Public Works, etc.

It may be possible to secure at the same time as the destruction of anophelines not only the treatment of actual malaria cases but also mechanical protection and chemical prophylaxis. The last mentioned can be carried out suitably in the case of children by means of chocolate tablets of quinine and in the case of adults the drug should be given in liquid form. It must not be forgotten that certain people object to treatment, in which case special measures are required, notably their removal from the infected locality. Both mechanical protection and chemical prophylaxis are difficult to carry out.

The author demands that at Fiumicino the Civil Engineers should assume charge of antimalarial work, oiling, regulation of irrigation, etc., with a 3 kilometre radius. Work should not cease during the winter months as larvae of *A. claviger* are found in November, and towards the end of December *A. bifurcatus* has been found breeding. Large quantities of oil for treatment of breeding places are needed. Breeding is again in evidence in March, as when the author started his work in April he found active breeding and not hibernation taking place. Therefore cessation of work between November and May is of serious import. It would be interesting to continue destruction of mosquitoes during the winter months in view of the uncertainty which exists as regards reproduction in winter and the conditions under which the adults pass through the cold weather. Much might be learned concerning the value of mosquito destruction during this season of the year.

A. B.

SUSINI (Albert). Douze ans de campagne antipaludique à Brazza (Département d'Alger).- *Malariologia*. 1918. Dec. 31. Vol. 11. Ser. 1. No. 5-6. pp. 108-110.

Brazza in Algeria had a reputation for unhealthiness and all the factors favourable for malaria were present in it, there being two rivers with numerous breeding places of very dangerous anophelines in their banks and many malaria carriers with enlarged spleens in the

vicinity. An anti-malarial campaign on the lines recommended by Et. SERGENT and comprising clearing of undergrowth, petrologe of pools, training of streams and rigorous quininization of the population, both European and native, was instituted with very gratifying results and at a very small cost.

A. B.

HAUTEFEUILLE (Emile). *Assainissement Antipaludique à Palikao (Département d'Oran.)—Malaria* 1918. Dec. 31. Vol. 11. Ser. 1. No. 5-6. pp. 100-107. With 4 figs.

This is an account of the rescue of a village in Algeria from the clutches of malaria by the anti-mosquito methods which have proved so successful in other parts of that country and which were carried into effect in 1914. A couple of lakes had to be cleared of vegetation and irrigation canals were cemented for a distance of three kilometres. There are sketches showing the upper and lower lakes, their immediate surroundings and their relation to the village of Palikao. A plan of the latter indicates the distribution of malaria during the epidemic of 1913 and shows how the heaviest incidence of the disease occurred in persons living in that part of the village nearest the upper lake where the chief anopheline breeding places were found. There is nothing new to record as regards the methods employed. They were highly successful and led the author to recommend a further concreting of the irrigation canals, an annual clearing of the lakes and a supervision of temporary pools.

A. B.

PAISSEAU (G.). *Une entreprise d'assainissement antipalustre au Maroc.—Bull. Soc. Path. Exot.* 1919. May. Vol. 12. No. 5. pp. 274-288.

The locality under consideration in this country is the very rich but exceedingly unhealthy valley of Sébou. An instructive epidemiological chart shows the extensive marshes of this region and indicates in a graphic manner the splenic indices of its villages. In some cases the spleen index is over 80 per cent. A Medical Commission surveyed the valley from the malarial standpoint and an account of its researches is given. *Anopheles maculipennis* was almost the sole species of anopheline present. The necessity of rendering this important valley healthy having been established, the measures to be adopted are set forth. These follow the usual lines.

It may, however, be noted that amongst other measures the author recommends preventive quininization, the dose of quinine advocated being 50 gm. [7 7 grains] daily.

A. B.

PORTER (F. J. W.). *Quinine as a Prophylactic in Malaria.* [Correspondence.]—*Lancet.* 1919. July 26. p. 175.

The author quotes an extract from the medical history of the war in the Gold Coast Protectorate in 1873 by Deputy Surgeon-General Sir A. D. HOME, V.C., K.C.B., adverse to the use of prophylactic

quinine, which was said neither to ward off attacks nor to mitigate their severity. No details as regards dosage or administration are given. Porter's experience at Freetown was also on the whole unfavourable, but in his letter he merely mentions that each soldier at Freetown during the year he acted there as senior medical officer received 10 grains of quinine on Thursday and 15 grains on Friday. There were 25 per cent. less attacks than during the previous year, a result which he does not think justifies the use of the drug as a prophylactic, at least in these doses.

A. B.

BENTMANN Ueber die Malaria im Taurus (Kleinasien) nebst Bemerkungen zur Bewertung der Malaria-Schutzbehandlung durch Chinin. [Malaria in the Taurus (Asia Minor) together with Remarks on the Efficacy of Quinine Prophylaxis.]—*Deut. Med. Woch.* 1919. June 19. Vol. 45. No. 25. pp. 686-689. With 1 fig.

This is a lengthy paper chiefly concerned with malaria in the Taurus region of Asia Minor, and more especially with the conditions prevailing during the war at the military post of Tschamalan. It is chiefly of local interest but in the latter part of the article the author expresses his views as regards malaria prophylaxis by quinine.

Bentmann is opposed to the views of FLEBBE, who objects to quinine given prophylactically on account of the danger of producing tolerance to the drug and who in support of his contention has cited one case in which a man had lived for nine years in a malarial district without taking quinine and who, when he finally contracted an infection with *P. falciparum*, was definitely cured by a single injection of 1 gm. of quinine given intravenously.

Bentmann admits that the case is noteworthy but points out that one swallow does not make a summer. He is himself definitely in favour of quinine prophylaxis, which he regards as the most favourable method, next to anti-mosquito operations and mechanical protection, against malarial infection. He considers it absolutely necessary in the case of large bodies of men in the field.

[Unfortunately the author gives no details of the method he employed and which he would recommend.]

A. B.

- i. VAILLANT (Louis). L'examen du sang des paludéens par la méthode de la goutte épaisse.—*Bull. Soc. Path. Exot.*, 1919. July 9. Vol. 12. No. 7. pp. 375-379.
- ii. SUTCLIFFE (W. H.). Prophylactic Use of Quinine in Malaria.—*Brit. Med. J.*, 1910. June 7. p. 726.
- iii. NEVER-LEMATRE & ZEMBOULIS (R.). Paludisme et dysenterie amibienne autochtones.—*Bull. et Mém. Soc. Méd. Hôpit. de Paris*, 1919. May 15. Vol. 35. No. 10. pp. 428-432.

i. The author describes the method of examination of malarial blood by the thick drop, using a weak alcohol solution for dehaemoglobinizing instead of water. No new facts are brought out and the use of weak alcohol for the purpose of dehaemoglobinization is of very general application and has been employed for a number of years.

ii. Commenting on letters by Colonel RAWNSLEY and Dr NEWELL on the above subject the author suggests that the opinion of R.M.O.'s who served in the Struma Valley during 1916-1917 might be taken as regards the question if quinine sulphate is of any use as a malarial prophylactic.

He points out the inevitable difficulties which attended the distribution of quinine on the Struma front and indicates that so far as malaria was concerned the harm had already been done before adequate preventive measures were taken.

iii. The authors apply the term autochthonous malaria not only to malaria occurring in malarious parts of France but to that contracted in uninfected areas by persons coming into contact with cases from elsewhere. The records of three cases are given, together with the laboratory findings. One of them suffered at the same time from amoebic dysentery, also contracted in France. The species of anophelines implicated are not stated and there is nothing of special interest in the paper meriting detailed notice.

A. B.

AMOEBIASIS AND DYSENTERY

AMOEBIASIS.

KOPOLD (C. A.), KORNILAUER (S. I.) & SWIRY (O.). **Criteria for Distinguishing the Endamoeba of Amebiasis from other Organisms.** —*Arch. Intern. Med.* 1919. July 15. Vol. 24. No. 1. pp. 35-50 With 43 figs.

Entamoeba nana, the new *Endamoeba* (*sic*) of WENYON and O'CONNOR would appear to be the commonest intestinal amoeba in American troops

Out of 1,200 men *E. nana* was found in 28 per cent

E. coli " 23 "

E. dysenteriae (*sic*)

[*E. histolytica*] 9.3 "

E. nana has therefore a wide geographical distribution, and the examiner must be prepared to distinguish *E. nana* from *E. coli* and other amoebae. Mixed infection of *E. nana* and *E. dysenteriae* are the rule rather than the exception. The free-forms of *E. nana* appear rarely in formed stools, but may occur in large numbers in liquid motions after a saline purge. In the solid stool the sluggish free forms have a single, broad and hyaline pseudopodium; in liquid stools they are more active and the pseudopodia are more slender.

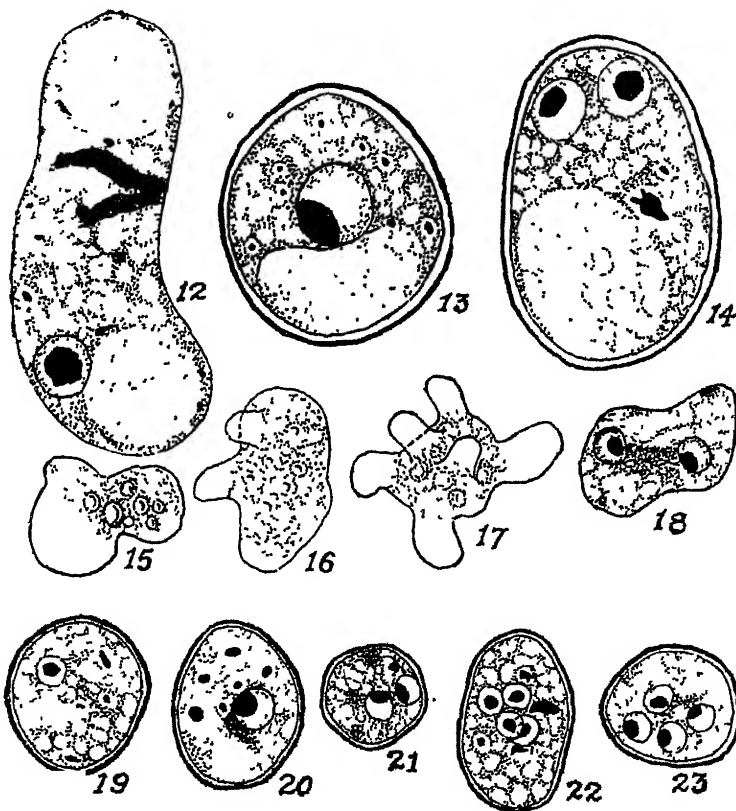
The presence of highly refractive, bacteria filled food vacuoles in *E. nana* is of value in differentiation. The structure of the nucleus as it appears when stained is regarded as an absolutely diagnostic criterion in which the authors appear to confirm WENYON in every particular. In *E. dysenteriae* there is a central karyosome and the peripheral chromatin is scattered over the nuclear membrane in granules of a small size; whereas in *E. nana* there is no central granule and the peripheral chromatin is massed in a single large clump at one point on the nuclear membrane.

This contrast may sometimes be made out in the living material. The most useful method for differential diagnosis of the cystic stage is DONALDSON'S iodine-eosin stain (DONALDSON, *Lancet*, 1917, Apr. 14, p. 571) of which the original formula is five per cent. aqueous solution of potassium iodide saturated with iodine one part, saturated aqueous solution of either eosin or Rubin S one part, mixed fresh each morning.*

The authors have modified this solution by substituting physiological salt solution and by reducing the proportion of iodine as follows: Saturated solution of eosin in normal saline, two parts; 5 per cent. potassium iodide in normal saline saturated with iodine, one part; normal salt solution, two parts.

The preparation is made by triturating a small portion of the faeces in normal saline and gradually adding the staining mixture. The nuclei of the cysts become clearer as the iodine penetrates, especially in *E. coli* and *E. dysenteriae*, but more slowly in *E. nana*.

* The authors point out that in the formula for DONALDSON'S stain published in this *Bulletin*, Vol. 10, p. 150, ether is given as an ingredient. This is incorrect. For the words *ether*, and substitute *ether*.



Endamoeba nana—large and small races.

Figs 12 to 14.—Large race of *Endamoeba nana*, stained with iron hematoxylin, $\times 2,800$. (12) Sluggish, free amoeba from formed stool, mononucleate with two empty glycogen vacuoles, a large, irregular chromatoidal rod, and several bacteria-filled food vacuoles. Chromatin clump of nucleus in face view; 9 by 22 microns. (13) Large, mononucleate cyst with glycogen vacuole, numerous food vacuoles, and chromatin clump in side view; 12 by 13 microns. (14) Binucleate cyst with large glycogen vacuole, large food vacuole, and chromatin clump in face view, 11 by 17 microns.

Figs. 15 to 23.—Small race of *Endamoeba nana* (6-8 microns), stained with iron hematoxylin, except figures 15 to 17, which were drawn from living specimens; $\times 2,800$ (15, 16, 17). Three successive positions of a small *E. nana*, from stool after saline purge, on warm stage; 8 to 10 microns. (18) Sluggish, binucleate, free amoeba with oblique and lateral views of peripheral chromatin clump; 5 by 9 microns. (19) Mononucleate cyst with several food vacuoles and no glycogen vacuole of chromatoidal body; 7 microns. (20) The same with small glycogen vacuole, numerous food vacuoles and no chromatoidal rod; 7 by 8.5 microns. (21) Minute binucleate cyst; 5.5 microns. (22) Ellipsoidal cyst with four nuclei; chromatin clumps in face view, three food vacuoles and an irregular chromatoidal body, 7 by 9 microns. (23) Quadrinucleate cyst with chromatin clumps in side or oblique view; 7 microns.

The concentration methods of CROPPER and ROW [this *Bulletin*, Vol. 9, p. 421] add ten per cent to the number of cysts observed in a direct smear. The following useful table is given to differentiate the cysts.—

Criterion	<i>E. dysenteriae</i>	<i>E. nana</i>	<i>E. coli</i> .
Size	6-15 microns	5-12 microns	11-22 microns
Shape.	Spheroidal, sometimes asymmetrically and rounded	Ellipsoidal in smaller forms, ovoidal in larger, frequently irregular, sometimes spherical	Spheroidal, sometimes ellipsoidal; ovoidal or irregular.
Optical properties, unstained.	Most highly refractive, glassy, often irregularly vacuolated, light grayish blue, nuclei rarely visible, glycogen mass not visible.	Less highly refractive but with highly refractive granules grayish blue; nuclei invisible glycogen mass distinct.	Least highly refractive homogeneous porcelainous, grayish blue, nuclei faintly visible, glycogen mass faintly visible
Stained with iodine-cosm	Cytoplasm bright greenish, yellow; coarsely vacuolated, in small races evenly but finely granular. Nuclei distinct with highly refractive, thick border and distinct central granule. Glycogen diffuse; if massed, with vague limits.	Cytoplasm greenish yellow with numerous small refractive vacuoles. Nuclei indistinct with thin border and peripheral chromatin blob. Glycogen dense, in one or more large shapely defined masses, seldom central	Cytoplasm coarsely uniformly granular yellowish brown.
Nuclei, number	Cyst stains red more quickly. 1—30-45% 2—13-30% 3—rare 4—25-55%	Cyst resists stain longer 1—Very common 2—Less common. 4—Common in small race, very rare in large one.	Cyst usually resists stain longer 1—Very rare 2—Rare 4—Very rare 8—Very common. 16—Very rare
Structure	Central granule distinct, peripheral chromatin distributed rather evenly in small plaques.	No central granule; nuclear membrane indistinct; peripheral chromatin gathered in a single blob on the membrane.	Central granule distinct; peripheral chromatin in a few large plaques on the nuclear membrane.
Chromatoid substance	In one stout bar or several slender bars with rounded ends. Present in about 50% of the cysts.	In several rounded or irregular masses. Rarely present.	In stout or slender splinters with square or sharp ends. Present in about 5-10% of the cysts
Cyst Wall.	Thin, distinct.	Variable, less distinct.	Thicker, very distinct.
Size races.	Very evident. Small race at 7 microns, large race at 13-14 microns, and one at 10 microns are the most frequent.	Very evident. One at 5-7 microns and one at 8-10 microns, probably a still larger one at 12-15 microns, most frequent.	Less evident. Probably one at 15, one at 18 microns and one larger.

The rest of the paper contains no new points. They have noted *Waskia intestinalis* of WENYON & O'CONNOR rarely, but have not confirmed in any way its structural details.

P. H. Manson-Bahr.

YORKE (Warrington) & MACFIE (J. W. S.). The Phagocytosis of Erythrocytes by an Amoeba of the *Limax* Type.—*Ann Trop. Med. & Parasit.* 1919. July 31. Vol. 13. No. 2. pp. 133–135. With 1 fig.

Amongst the rules laid down by WENYON & O'CONNOR as a guide to the diagnosis of amoebae in the stools the following statement is made:—"If amoebae containing red blood corpuscles are present in a stool, whether evidently dysenteric or not, they are *E. histolytica* and mean that some active dysenteric process is going on." On the other hand JAMES (1914) states that occasionally he has found one or two red cells in *E. coli*.

The fact that the former two observers failed in their attempts to induce *E. histolytica* to ingest fresh red cells from finger blood when placed together in the incubator, would indicate that the behaviour of *E. coli*, under analogous conditions, is inconclusive as a means of differentiation between these two species.

This power of phagocytosis, which has been regarded by writers during the war as the hall mark of *E. histolytica*, cannot be considered in this light any longer since Yorke & Macfie have proved that an amoeba of the *Limax* type, originally obtained from faeces and cultivated for over four years on Musgrave and Clegg's medium, greedily engulfs red blood corpuscles when subcultured on the same medium to which one third of fresh blood has been added, although, at the same time, similar live amoebae failed to do so, when mixed with red cells *in vitro*.

It appears then, that there is no reason to doubt the ability of *E. coli* to phagocytose erythrocytes should it encounter blood while it is in an active state. It must be remembered that *E. coli* can ingest cysts of *E. histolytica* and of intestinal flagellates (and apparently sporoblasts of coccidia as well). If capable of doing this it is difficult to believe that it is unable to deal with erythrocytes in the same way.

Four figures of Amoebae with typical *Limax* nucleus and ingested red cells illustrate the article.

P. H. M-B.

WOODCOCK (H. M.). Note on the Epidemiology of Amoebic Dysentery.—*Jl. Roy. Army Med. Corps.* 1919. Mch. Vol. 32. No. 3. pp. 231–235. With 1 chart

The opinions of WENYON and O'CONNOR in relation to the importance of flies as carriers of the cysts of *E. histolytica* and the cysts of other intestinal protozoa are criticised. The author considers that other important factors are responsible for the survival and transmission of the cysts and he states his reasons for believing that "plenty of moisture and a high degree of humidity" are the most important factors governing intestinal protozoal prevalence in a particular area, and that water is the "principal vehicle of transmission."

F. W. O'Connor.

MARCHOUX (E.). L'amibe dysentérique est-elle bien la cause de la dysenterie?—*Bull. Soc. Path. Exot.* 1918. Dec. Vol. 11. No. 10. pp. 837–839.

Having believed for many years that *E. histolytica* was the cause of clinical amoebic dysentery the author feels compelled to change

his opinion and he now believes that some other organism (unknown) is probably the cause of the clinical condition. A considerable number of stools were examined in Angoulême; most of these contained cysts but there were no cases of dysentery. In a series of cases of amoebic dysentery (clinically diagnosed) no amoebae, free or encysted, were found. Although the author succeeded in infecting a cat from a case of amoebic dysentery and recovered the amoebae in the animal yet his colleague Dr. BOURRET failed to infect a cat at St. Louis in Senegal. The writer believes that the real causative organism was lacking in the latter case though present in his own

F. W. O'C.

SMITH (A. Malins). Cases of Acute Amoebic Dysentery in Asylum Patients never out of England.—*Ann Trop Med. & Parasit* 1919. July 31. Vol. 13. No. 2. pp. 177-185.

Asylum dysentery has been considered to be of bacillary origin. GETTINGS (1915) isolated at the height of an epidemic in 1913 the Flexner bacillus from 50 per cent. of cases he examined. This left half the cases unaccounted for and did not exclude the possibility of some being amoebic, and this possibility was strengthened by the fact that some of the asylum cases relapsed.

Examinations of patients at Rainhill asylum showed that out of 60 acute cases 3 or 5 per cent. showed free *Entamoeba histolytica* with ingested red cells in the stools. Two males had never been out of England while the third, a female, had landed in France during her childhood. The occurrence of this case is certainly of very considerable interest.

Thus the occurrence of acute amoebic dysentery in the asylum is definitely established, but no exactitude can be claimed for the 5 per cent. as showing the true proportion of amoebic dysentery; probably in other asylums it may be higher, but certainly for Rainhill it is a minimum. As is well known (cf. WENYON and O'CONNOR "Human Intestinal Protozoa in the Near East" 1917. pp. 65-66) every acute case does not pass characteristic entamoebae in every stool; a proportion therefore must be missed.

In 60 per cent. of the stools pus cells predominated and indicated (according to WENYON and O'CONNOR, WILLMORE, SHEARMAN and BAHR's work) that the majority were bacillary in origin. It is possible that in one case, a carrier of *histolytica* cysts, a bacillary attack was the exciting cause and the amoebic a secondary consideration. [By this the author really means that it gave the apparently somnolent *Entamoeba* a foot-hold in the intestinal mucosa and one is inclined to think that is the explanation of these apparently puzzling cases which lead to recrimination between the protozoological and bacteriological schools].

The whole number of asylum patients examined was 504; the majority had no physical ailments and the commonest disease was dysentery.

The usual protozoa were found in the stools, but infections were distinctly less numerous than in patients in other asylums previously examined.

A summarized comparative table of results of stool examination is appended which will be found useful and instructive.

	Home Population.				Returned Soldiers.		
	Rainhill Asylum	Whittingham Asylum	Adult Civilians Hospital Population.	Childr. n Hospital Population	Army Recruits.	Dysenteric Convalescents	Non-dysenteric Convalescents.
No. examined	504	207	450	548	1098	4068	450
<i>Entamoeba histolytica</i> .	4.2	9.7	1.5	1.8	5.6	7.0	6.4
<i>E. coli</i>	21.4	45.9	6.7	11.1	18.2	15.2	14.2
<i>E. nana</i>	3.0	12.1	2.4	2.7	5.5	—	—
<i>Giardia intestinalis</i> ..	5.0	3.4	6.0	14.1	7.0	9.9	6.0
<i>Chilomastix mesnili</i> ..	6.7	23.2	1.5	1.8	0.2	3.6	2.0

P. H. M-B.

KUENEN. [L'Amibiase dans les Pays Bas.]—*Nederl.-Tijdschr. v. Geneesk.* 1918. Sept. 28. p. 1140. [Summarised in *Bull. Office Internat. d'Hyg. Pub.* 1918. Vol. 10. No. 12.]

During routine examinations of the stools of patients admitted to hospital for various conditions the author found a number of *E. histolytica* cyst-carriers, generally amongst the old colonists; but in 8 cases the patients had never previously left the Netherlands. Details of these 8 cases are given. Three of them were a mother and her two daughters. He wonders if amoebiasis is indigenous in the Netherlands.

F. W. O'C.

LABBÉ (Marcel). La fréquence des dysenteries amibiennes méconnues. —*Bull Acad Méd.* 1919. Apl. 29. Vol 81. No. 17. pp. 550-552.

Eight cases are recorded, seven of which had not been out of France, in which the patients suffered from diarrhoea and colic associated with the presence of free amoebae or cysts in the stool. Treatment with emetine injections caused rapid improvement in the patients' general condition with cessation of diarrhoea and disappearance of parasites from the stools. The author believes that amoebic infection with or without a chronic form of dysentery is more common in France than one would have supposed.

F. W. O'C.

MAYER (Martin). Klinische, morphologische und experimentelle Beobachtungen bei Amöbenerkrankungen. [Clinical, Morphological and Experimental Observations on Amoebiasis.]—*Arch. f. Schiff- u. Trop.-Hyg.* 1919. June. Vol. 23. No. 10. pp. 177-210. With 8 charts.

This is a long drawn out paper dealing with amoebic dysentery as seen during the war at Hamburg and is divided into four sections.

The first deals with emetine treatment; the second with Simaruba the third with the microscopic diagnosis and morphology of *E. histolytica*; while the fourth concerns experimental amoebiasis in cats.

The conclusions are —

1. Emetine hydrochloride is especially useful in amoebiasis of the liver, but does not prevent relapses. It should be used whether it is necessary to operate on the case or not.

2. In amoebiasis of the gut numerous emetine-resistant strains of *Entamoeba* were encountered, in these cases one should combine emetine with simaruba* and extract of pomegranate bark

3. The author has no very great success with emetine-bismuth iodide (four cases). Emetethylin (Karrer) (ethyl-ether of cephaelin) was in no way superior to emetine alone (two cases).

4. The morphological distinctions between *E. coli* and *E. histolytica* are not so important for the practitioner if he takes into account the clinical aspects of the case. (The cysts of amoeba and lamblia can be preserved intact for years in faeces in 5 per cent. formalin.)

5. As many as 59 passages of the original strain can be made from one cat to another. Liver abscesses were found on 1 occasions in 136 infected cats. Spontaneous healing may take place.

6. The therapy of entamoebiasis in cats is not successful. Emetine failed and Emetethylin was efficient, but very toxic to these animals.

P H M-B.

LASNIER (E. P.). [Amebic Tumors in Large Intestine].—*An. de la Facultad. de Med. Montevideo*. 1918. Nov. and Dec. Vol. 3. No. 11-12. p. 810. [Summarised in *St. Amer Med. Assoc* 1919. May 24]

Illustrative cases showing that tumors of amoebic origin may occur in the large gut. This possibility should lead one to search the stools for entamoeba in cases of intestinal tumours of obscure origin.

P. H. M-B.

HAMMERSCHMIDT (Johann). Zur Pathogenese der Amöbenkolitis. [Pathogenesis of Amoebic Colitis].—*Arch. f. Schiff- u. Trop.-Hyg.* 1919. July. Vol. 23. No. 14. pp. 291-306. With 6 figs.

Many authors deny the capability of *Entamoeba histolytica* penetrating the bowel wall in the absence of some previous lesion, and with the object of throwing light on this question a study of the intestinal tract of a remarkable case was made.

The subject, about 38 years of age, died in Vienna of pernicious anaemia with obscure gastric symptoms; several months previously

*The formula for Simaruba used during the war was:—

Corticæ simarubæ	10 gms.
Cortic. granati (pomegranate bark) ..	10 gms.
Spiritus 90 per cent.	90 cc.
Tinct. aromat.	20 cc.
Aq. distillat.	ad 750 cc.

Macerate for 20 hours. (The individual dose is not given).

he was said to have passed blood in his stools, otherwise there was no suspicion of amoebiasis. Quite by accident in serial sections of the upper portion of the rectum a recent invasion of the otherwise undamaged mucosa by amoebae was found at such an early stage as is only generally observed in experimental amoebiasis in cats. Neither the clinical history of the case, nor indeed the gross pathological picture, had any bearing on amoebiasis nor could any lesion of the intestinal mucosa be ascertained by the naked eye.

In one portion of the section a small break in the surface epithelium was occupied by a deposit of bacteria and detritus and large numbers of amoebae. The amoebae appear to multiply in the intestinal tissue and then enter the lumen of Lieberkuhn's follicles through the membrane propria; thus they do long before they have invaded the submucosa or the muscularis mucosae.

The inflammation exudate round a nest of *Entamoebae* is composed for the most part of lymphocytes and plasma cells, whereas polymorphonuclear leucocytes are relatively scarce.

The absence of necrotic or degenerative changes in the neighbouring epithelial cells is a noteworthy point.

Hammerschmidt is inclined to think that so far from any toxic secretions emanating from the *Entamoebae* the lesions of the mucosa are due to their mechanical action in symbiosis with bacteria. The greater part of the paper is occupied with a dissertation upon the views of previous investigators upon the mode of penetration by *Entamoeba histolytica*, but the author has come to the conclusion, on what would appear to be inadequate grounds, that in this particular case he is dealing with *Entamoeba coli*.

P. H. M-B.

MATTHEWS (J. R.). *The Course and Duration of an Infection with Entamoeba coli.*—*Ann. Trop. Med. & Parasit.* 1919. May 12. Vol 13. No. 1. pp. 17-22.

A case of *E. coli* was under observation for a considerable time, from August 1916 to the time of publication. Since July 1918 numerous negative examinations have been recorded. The author draws attention to periodicity which however shows no evidence of regularity. He does not see any reason why infections with this parasite should not disappear spontaneously.

F. W. O'C.

MACADAM (William). *A Report on the Treatment of Various Types of Entamoeba histolytica Infection by the Combined Hypodermic and Oral Administration of Emetine Hydrochloride.*—*Indian J. Med. Res.* 1919. Jan. Vol. 6. No. 3. pp. 363-379.

Eighty cases of *E. histolytica* infection were treated with emetine hydrochloride. The total amount given in each case was 18 grains spread over a period of 12 days. Each day 1 grain hypodermically and $\frac{1}{2}$ gr. orally was administered. Following treatment, the stools of each case were examined on 26 days during 6-8 weeks and in 71 cases the further progress of the case was followed for 6 to 9 months.

The series of eighty cases is classified as follows:—

- A. *Those passing typical free forms of Ent. histolytica with ingested red blood cells* .. 48 cases

These 48 cases are subdivided into:—

- i. Primary dysenteric attacks .. 12 cases.
 ii. Chronic dysenteric infections undergoing an acute relapse .. 36 cases.

- B. *Carriers of histolytica cysts* .. 32 cases.

These 32 cases are subdivided into:—

- iii. Incompletely cured acute attacks which had passed into the cyst-carrying stage before coming under observation .. 12 cases.
 iv. Accidentally discovered cyst-carriers with no previous history of dysentery or amoebiasis but showing a heavy and persistent cyst-infection .. 12 cases.
 v. Accidentally discovered cyst-carriers with a previous history of dysentery .. 8 cases.

The results of treatment in those various groups are tabulated as follows:—

			Cases.	Cured.	Relapsed.
Group	i	.. ..	12	11	1
"	ii	.. ..	36	25	11
"	iii	.. ..	12	9	3
"	iv	.. ..	12	10	2
"	v	.. ..	8	7	1
			—	—	—
	Total	..	80	62	18
			—	—	—

Of the 18 relapses 13 were discovered within 4 weeks following the termination of the treatment. Amongst the 71 cases followed for 6–9 months there were 6 dysentery relapses among 15 persistent cyst-carriers. There was only one mild relapse amongst the 62 cases declared "cured."

The results compare very favourably with those of other workers by the different methods and drugs employed. The writer advises that primary acute attacks and cyst-carrier cases with evidence of slight ulceration should be treated by the method described in the paper.

F. W. O'C.

PERCHERON. Observations sur l'action du chlorhydrate d'émétine dans la dysenterie ambienne à Casablanca (Maroc).—*Ann. d'Hyg. et de Méd. Colon.* 1914. Vol. 17. No. 3. pp. 1022–1032. [Received in May 1919.]

Twenty-one patients infected with "*Amoeba tetragena* Vierock" (diagnosed microscopically in the stools) were treated with 14 injections of 4 cc. emetine hydrochloride. 13 out of 15 cases in one observation showed improvement after the first two or three injections, blood disappearing from the stools, which became less frequent. In the two others amelioration of symptoms was not maintained.

F. W. O'C.

HUERRE (R.). *Le traitement de l'amibiase par l'émétine.*—*Gaz. des Hôpiti* 1919. Aug 30 Vol 92. No. 50. pp. 787-788.

A general statement on the dosage of emetine. The French chlorhydrate of emetine is excellent but the drug varies considerably according to its source. To children it should be given hypodermically, to a child of 10 weighing 21 kilogrammes daily in dose of 2, 3 and 4 centigrammes. Doses of 1 centigramme are suitable for children under 2 years. As regards the amount for adults opinions differ. CHAUFFARD never exceeds 10 cgm. for adult dose, nor gives less than 6 cgm. It should be given for 6-8 days continuously with a break of from eight to fifteen days. The elimination of the drug is not complete till after a period of 40-60 days (DOPTER).

P. H. M-B.

RAVAUT (P.) & CHARPIN. *Sur quelques faits en apparence paradoxaux susceptibles d'égarer le diagnostic d'hépatite amibienne.*—*Presse Méd.* 1919. Feb. 10. Vol. 27. No. 8. pp. 65-67. With two charts.

In studying cases of doubtful hepatitis or liver abscess the past history of the patients is considered to be very important. Half of the authors' cases gave a history of past dysentery; the other half complained of simple diarrhoea without blood, alternating with periods of constipation. Where pus is suspected exploratory puncture should be undertaken. If pus is not found the authors treat their cases therapeutically. They give an intravenous injection of 0.3 gm. novarsenobenzol every six days till 10 injections have been administered. Between the first 4 injections emetine hypodermically in doses of 4, 6, 8 cgm. is given on three consecutive days. The emetine is suspended between the 4th and 7th days, to be commenced again, as before, on the 7th day. The patient receives in 40 days, 10 arsenical and 18 emetine injections. The writers claim excellent results from this treatment.

F. W. O'C.

ROBERT (Léopold) & SAKDA (Hluang). *Appendicite et hépatite suppurée à balancement dues à l'association coli bacillo-amibienne.*—*Med. J. Siamese Red Cross.* 1918. Aug. Vol. 1. Part 2 pp. 163-166.

The patient, a medical officer, was treated with emetine hydrochloride injections for amoebic dysentery in 1914, and improved rapidly. He was on duty for three years following, till June 1917, when abdominal trouble became marked. On examination evidence of hepatic suppuration and of appendicitis was found. Pus was found on aspirating the liver and on operation an abscess in the right lobe was opened and drained. In the pus numerous amoebae were found as well as *B. coli*. The general condition not improving, and signs of appendicitis with irregular temperature and polymorphonuclear leucocytosis being observed, an incision was made and an abscess of the appendix was evacuated, in the pus from which numerous amoebae as well as *B. coli* were found.

F. W. O'C.

PAISSEAU (G.) & HUTINEL (Jean). *Hépatite amibienne chronique.*—*Bull. et Mém. Soc. Méd. Hôpt. de Paris.* 1918 Nov. 21 3 Ser. Vol. 34. No. 30-31. pp. 1007-1011.

Chronic amoebic hepatitis as distinct from the suppurative condition has been studied by the authors and is described in this paper. The condition, which generally occurs in patients with a past history of dysentery, is a subdiaphragmatic hepatitis characterised by the following symptoms:—Pleuro-pulmonary reaction at the level of the right base and symptoms radiating from the diaphragm; acute and sometimes stabbing pain over the liver, sometimes only a sensation of fullness in the right flank. There may be slight or great tenderness on pressure, it may be general or localised in the epigastric region. The liver is enlarged. Sibilant sounds or moist râles and pleural friction may be heard over the right base; vocal vibrations are diminished. Pain in the right shoulders more constant than in liver abscess. Other symptoms are dyspnoea, digestive disturbance and subicterus. The temperature is generally not more than 38° C. The transition from hepatitis to abscess is then considered. Treatment of the hepatitis was carried out with emetine in a series of successive injections; 3 series of 72 centigrammes of the drug within three months. Intolerance to emetine was sometimes observed. The best means of administration was found to be as follows:—

8 centigrammes daily for 6 days.	A month later
6 " "	8 days; and a month later
4 " "	10 days. Repeated three or 4 times.

F. W. O'C.

GIBSON (C.). Notes on Liver Abscess. Founded on Cases at a Stationary Hospital, Palestine. *Brit Med. J.* 1919. Aug. 16. pp. 202-203.

This able paper deals from the surgical point of view with five indigenous cases of hepatic abscess from the Palestine front. According to their position they could be divided into epigastric and sub-diaphragmatic. Three were fortunately of the former; the remaining two, which proved fatal, were of the latter variety.

In the diagnosis Gibson makes some valuable observations which have been fully borne out by the experience of other workers on this front during the war. They are as follows:—

(a) A history of *previous diarrhoea* or dysentery is suggestive but by no means conclusive.

(b) *Pain* is necessarily present in every case of unilobar abscess owing to distension of the liver.

(c) *Tenderness* is maximal over the site of the abscess.

(d) The intermittent pyrexia is less regular than in the cases of abscesses of pyogenic origin.

(e) As regards the bacteriology the presence of *Entamoeba histolytica* or its cysts is very valuable but by no means necessary; as a matter of fact no Entamoebae were found in any of these cases.

To obtain satisfactory results the specimen must be examined shortly after evacuation and several examinations are necessary before a negative result is accepted. *Entamoeba histolytica* is not necessarily

present in the pus drawn off. [As pointed out by Sir Patrick MANSON they are seldom found in the centre of the cavity but only in the residual pus exuding from the drainage tube after 2 or 3 days, representing the exudate in immediate contact with the walls of the cavity.]

(f) The leucocytosis is generally a moderate one

As regards the differential diagnosis several points arose owing to the presence of influenzal broncho-pneumonia. Pulmonary consolidation secondary to hepatic tenderness suggests hepatic abscess with secondary pulmonary involvement. Difficulty arose too in malignant malaria cases with hepatic enlargement and right basal broncho-pneumonic consolidation, which was so prevalent at the same period. Then too the liver was enlarged and tender and splenomegaly, as in so many of these early malarial cases, was no sure guide. Malaria being proved by a blood examination and the broncho-pneumonia being obvious from its physical signs—that is two clinical entities to explain existing signs and symptoms—it seemed unreasonable to add still a third, so the possibility of hepatic abscess could be dismissed.

As regards the number of abscesses these patients successfully operated on had but one apiece, on the other hand in those who died the abscesses were multiple; in one case they had burst into the pleural and in the other into the peritoneal cavity

[This paper though short shows well the value of a careful analysis of a small series of cases by a competent observer.]

P. H. M-B.

CHAUFFARD (A.) & FRANÇON (F.). Abscès Amibien du foie guéri par l'émétine et le 914 sans opération. — *Bull. et Mém. Soc. Méd. Hôpit. de Paris*. 1919. July 17. Vol. 35. No. 24. pp. 698-702.

Report of an indigenous case of amoebiasis contracted apparently from intimate contact on active service with Colonial troops. No amoebae or cysts were found in the stools. The diagnosis was made on general symptoms and exploratory puncture. The case rapidly recovered on emetine together with 5 injections of "914" in doses of .15 augmented to .30 grammes. A complete cure without operative interference ensued.

P. H. M-B.

RAMOND (L.). Abscès du foie au cours d'une dysenterie amibienne autochtone. — *Progres Méd.* 1919. May 24. Vol. 34. No. 21. pp. 202-205.

Cases of hepatic abscess indigenous in France were reported before the war by CHAUFFARD, CAUSSADE, JOLTRAIN, GADE and THÉVENET. Since the war, it may be due to infection imported by Colonial troops. These indigenous cases have multiplied. The present paper concerns itself with the details of a case, a man of forty-four, who contracted amoebic dysentery in 1918 and developed a hepatic abscess in March

1919 He had never left France. The signs, symptoms and treatment of hepatic abscess are considered purely from the point of view of the practitioner who has not had the benefit of a tropical training.

P. H. M-B.

DIAS (Américo) A emetina e os abscessos amebicos [Emetine and Amoebic Abscesses.—*Bol. Ger. Med. e Farmacia*. Nova Goa. 1919 Jan. Vol. 5 No. 1. pp. 11 12]

The author insists on the importance of incision and drainage followed by a course of emetine and maintains that the disappointment expressed by many with the results of emetine treatment in cases of amoebic abscess is due either to neglect to evacuate and drain the abscess or to failure to follow up surgical treatment by the administration of emetine.

F. S. A.

MATHIS (C.). Unité ou pluralité des amibes [dysentériques.—*Ann. d'Hyg. et de Méd. Colon.* 1914. Vol. 17. No. 3. pp. 860-866. [Received in May 1919.]

The various amoebae described from time to time, as occurring in the human intestine, by different authors are discussed. Having recognised two definite species as "*Loeschia coli*" and "*L. histolytica*" the writer gives descriptions of the others, presumably from the original documents. In a summary he concludes that *E. hominis*, *E. tropicalis*, and *E. bütschli* are amoebae of the limax type to be placed in the genus *Valkampia* and that *E. phagocytoides* probably belongs to the same group: that *E. minuta* and *E. hartmanni* are identical with "*L. histolytica*": that *E. williamsi* is confounded with "*L. coli*": and that *E. nipponica* has no definite existence, being either "*L. histolytica*" or "*L. coli*." He believes that *E. polecki* and *E. undulans* require restoring, and that the same applies to *E. sp.?* Noc., and *E. brasiliense*. Finally the writer expresses belief that there is little evidence of plurality of species and that amoebic dysentery is caused by a single parasite "*Loeschia histolytica*."

F. W. O'C

SMITH (A. Malins). A Contribution to the Question of the Number of Races in the Species *Entamoeba histolytica*.—*Ann. Trop. Med. & Parasit.* 1919. May 12. Vol. 13. No. 1. pp. 1-16.

The present paper is a continuation of work previously published by the author on the subject of cyst strains in *E. histolytica* cases. Evidence is brought forward to show that the average size of cysts in infections with *E. histolytica* does not necessarily remain constant from day to day in cases examined for a long period. In infections amongst patients who have not left England a small proportion of "small" cysts and a reduced proportion of larger cysts of the ordinary

race is noticed compared with findings amongst convalescent dysenteric cases who have been overseas. The writer sees no evidence of more than two races of *E. histolytica* cysts.

[F. W. O'C.]

YOSHIDA (Kazuyoshi). Ueber die Auskeimung der Cyste von *E. tetragena* und *E. coli* in vitro. [Japanese Text.] [The Hatching of Cysts of *E. t.* and *E. c* in Vitro.]—*Mitt. d. Med. Gesellsch. z. Tokio* 1919. July 5. Vol. 33. No. 13. (Author's Summary in German, pp. 3-5.)

In October 1917 the author was able to satisfy himself that the cultivation of the parasitic amoebae outside the human body was not an impossibility: furthermore he was able to establish a sexual cycle or autogamy and to disprove the existence of schizogony in these protozoa, which CASAGRANDE, BARBAGALLO, SCHAUDINN and other workers had suggested. The technique employed was as follows:—

The stool containing cysts is first mixed with sterilised water and filtered through gauze and centrifuged several times with further additions of water on each occasion. The cysts deposited by this means are mixed for five minutes with 2 per cent. HCl and centrifuged once more. The residuum is then inoculated into the condensation water of a medium composed of 2 parts of a 2 per cent. agar and 1 part of defibrinated horse's blood.

Yoshida claims success in cultivating *E. tetragena* three times out of eleven and *E. coli* on seven occasions out of nineteen. The hatching of the amoeba takes place in each instance on the fourth day, but it dies off on the fifth or sixth as a result of bacterial contamination.

Only one young amoeba emanates from each individual cyst; it makes its way to the exterior by rupturing the cyst wall by means of its pseudopodia, whether the original cyst possesses four nuclei as in *E. tetragena*, or eight as in *E. coli*. The remainder of the cycle would appear to be the same in both species.

The free amoeba contains at first the same number of nuclei as in the original cyst, soon, however, fusion into one large nucleus takes place, or two large sexual nuclei (Synkaria) rich in chromatin are formed. The number of nuclei varies; as a general rule there are three to six in *E. coli* and two to three in *E. tetragena*. A study of this nuclear activity has convinced the author that the daughter nuclei within the cyst wall are analogous to the sexual nuclei of other protozoa, though in the amoeba no morphological sexual distinctions can be made out. The point in which Yoshida seems to differ from SCHAUDINN is that the hypothetical cycle which the former describes takes place in the free living amoeba and not within the cyst wall.

[This paper is illustrated by 14 microphotographs and a number of drawings; the former it must be confessed are very indistinct and unconvincing; the latter, mostly diagrammatic, are admirable though there is no verbal description as to the exact process or at what period all these figures were obtained. A period of two days would appear to be a very short one on which to observe so many stages. These views are in many ways in direct conflict with those held by WENYON & DOBELL as to the propagation of the parasitic amoebae.]

P. H. M-B.

KOFOED (C. A.), KORNHAUSER (S. I.) & SWEZY (O.). **Structure and Systematic Relationships of the "Iodine Cysts" from Human Faeces.** *Milit Surgeon* 1919. July. Vol. 45. No. 1. pp. 30-43. With 25 figs.

The "iodine cysts" in human faeces as described originally by WENYON and O'CONNOR include two different organisms, the large glycogen-laden mononucleate cyst of *Entamoeba nana* and the non-nucleated "homogeneous cyst" of some vegetable organism, possibly a chlamydospore of some phycomyceete. These iodine cysts intergrade in diameter and the size of their nuclei is the same as that of the large mononucleate *E. nana* cyst. The conclusion that they represent phases of the hypothetical *E. williamsi* of PROWAZEK has not been borne out. FLU'S conclusion that they are degenerate *tetragena* cysts is likewise untenable. There is no satisfactory evidence that the iodine cyst or "homogeneous body" of WENYON and O'CONNOR, which they took to be degenerate "nucleated iodine cysts," represent a degeneration of any amoeba or any other organism. They must be regarded as normal parasites without any indication as to their pathogenicity.

P. H. M-B.

MATHIS (C.). [Diagnosis of Amoebiasis.]—*Paris Méd.*, 1919. May 17. Vol. 9. No. 26. p. 389. [Summarised in *Jl. Amer. Med. Assoc.*, 1919. July 5.]

A discussion on the technique employed in the search for entamoebae and their differentiation. Illustrations show the parasite with which they are most likely to be confused.

P. H. M-B.

BRAU. Dysenteries ou diarrhées ambieuses traitées avec succès par les injections de chlorhydrate d'émétine (Service des dysentériques de l'hôpital militaire de Saïgon.)—*Ann. d'Hyg. et de Méd. Colon.*, 1914. Vol. 17. No. 3. pp. 964-1008. [Received in May 1919.]

Details of 68 cases of amoebic infection of the intestine, treated with emetine hydrochloride, are recorded in this paper. The results were good except in two cases where the parasites persisted in spite of treatment.

F. W. O'C.

MANSON-BAHR (Philip). **The Correlation of the Pathology and Bacteriology of Bacillary Dysentery.** A Dissertation on some of the Laboratory Problems arising in Connexion with this Disease in the Eastern Theatres of War.—*Jl. Roy. Army Med. Corps.* 1919. Aug. Vol. 33. No. 2. pp. 117-138. With 2 plates.

In the study of different forms of dysentery the author has had exceptional opportunities, for he has been in close touch with the fighting forces during the campaigns of Egypt and Palestine in the last three years of the war. The comparative rareness of amoebic dysentery was the first great fact that impressed itself upon him (1.05 per cent.) and he points out how great a margin of error was probable in the early examinations through the difficulties of establishing a bacteriological diagnosis. He describes very clearly what he considers to be the best method of procedure, and how by means of the use of "Garrow's agglutinator" it is possible to come to a

definite laboratory conclusion in 18 hours, but it is necessary that the specimen of faeces to be tested should be obtained early in the disease, a provisional diagnosis having been made from the character of the cellular exudate.

His statistics show that in examinations of 837 stools of British troops (August-December 1917), in 664 of which the specific cause could be determined, *E. histolytica* was found 7 times, *Lambhia* 6, and *Tetramitus* and *Trichomonas* 11 times. In 633 instances the provisional diagnosis from the exudate was bacillary dysentery, and of 342 stools plated 114 proved to be Shiga and 87 Flexner-Y cases.

A graph shows the relation of the various forms to the total stools examined, the maximum of the curve occurring in October, the proportion of amoebic to bacillary dysentery being one to ninety-five. With Egyptian troops the percentage rose as high as 14, but it is probable that all these were not acquired locally. From the facts ascertained the author believes that amoebic infection is acquired by armies on the march, while the bacillary is essentially one of standing camps.

A useful table is inserted showing the distinctive differences in the stools of the two forms of dysentery which assist in diagnosis.

The more the mucus is contaminated with bile or faeces, the greater the difficulty will be of isolating any pathogenic bacillus; from a purely faecal stool the author has never succeeded in isolating a true dysentery bacillus.

From a study of the cellular exudate in acute cases, he recognises three pathological stages. Stage 1, lasting three days, preponderance of pus cells, fresh red cells, endothelial cells, intestinal epithelial cells, and calcium phosphate crystals with few visible micro-organisms. Stage 2, subsequent three days, disintegrated pus cells, red cells, bile stained columnar epithelium, disintegrated macrophage cells and calcium phosphate crystals, with many micro-organisms. Stage 3, degenerated cells, haematoidin crystals, fatty particles, flagellates, and micro-organisms.

In stage 1, the bacillus can be isolated from the free mucous surface. In stage 2, it can be isolated from beneath the necrotic area. In stage 3, it can be isolated from the granulations beneath the desquamating necrotic membrane.

He found that under tropical conditions the specific bacillus cannot be isolated from the stool after it has decomposed for four hours, even when previously known to have been present; the specific bacilli had been overgrown by stronger organisms. It was also found that any urinary contamination was inimical to success.

Yeasts and so-called pseudo-dysenteric bacilli were occasionally found; these cannot be looked upon as causative organs but rather as secondary infections, and he thinks the terms pseudo and para-dysentery should be dropped.

In chronic conditions the pathological lesions in 55 cases were studied. The position of gut most affected is given and the character of the ulcers of both amoebic and bacillary infection are noted in tabular form. They are similar to those described by ROGERS, SHIGA, and RUGE. The occurrence of mucous cyst formations is noted and these are shown well in the plate. In twenty examinations

dysentery bacilli were isolated from the bases of the ulcers 11 times (6 Shiga and 8 Flexner-Y).

[The whole investigation is an excellent example of careful work and contains a large amount of most useful information arranged in such a way that the results are clearly indicated and easily memorised; they should be of great assistance to any student. Owing to local difficulties no attempt was made to divide the Flexner-Y into sub-groups.]

P. W. Bassett-Smith.

BOYD (J. S. K.). *A Case of Bacillary Dysentery in which Flexner-Y was recovered from the Blood Stream during Life.*—*Lancet*. 1919. Sept. 13. pp. 482-483.

There have been sixteen recorded cases of recovery of *B. dysenteriae* from the blood stream during life and the one described here makes the seventeenth. *B. dysenteriae* Shiga has been recorded twice only in this series, so that in this situation bacilli of the Flexner-Y type appear to be the more common. On the other hand Shiga's bacillus has been isolated post-mortem on 6 occasions. The present instance occurred in Salonika in a soldier with a typical attack of acute bacillary dysentery. The stools were typical and yielded abundant growth of Flexner-Y organisms and identically the same organism was recovered from the blood by haemoculture. The organism was agglutinated 1/1500 by specific serum and gave the classical sugar reactions.

P. H. M-B.

BACILLARY DYSENTERY.

MEDICAL RESEARCH COMMITTEE. National Health Insurance. *An Investigation of the Flexner-Y Group of Dysentery Bacilli.* [By the late H. S. GOTTINGS; arranged for press by S. R. DOUGLAS.]—Special Report Series, No. 30. 31 pp. 1919. London: H.M. Stationery Office. [Price 1s. net.]

This Report to the Medical Research Committee on the Flexner-Y Group of dysentery bacilli was written by Capt. S. R. DOUGLAS from notes left by the late Dr. H. S. GOTTINGS who, from 1912 to 1916 was pathologist to the Wakefield Asylum [Yorkshire] where he made an extensive study of asylum dysentery and died in June 1918 before collecting his results for publication. From investigations into the biochemical and serological reactions of 285 strains of Flexner-Y bacilli isolated from 39 cases of asylum dysentery, he found that although the biochemical reactions with a small selected number of carbohydrates is a rough means of identification of members of the coliform group of bacilli, it is impossible to classify a group of very nearly related bacilli such as the Flexner-Y group of dysentery bacilli into definite sub-groups by using an extended series of these carbohydrates. Ordinary agglutination tests also failed to divide this group of bacilli into definite sub-groups. By the use of the method of absorption of agglutinins, however, he found that it was possible to do so, placing 92 out of 95 strains of the Flexner Y group of dysentery bacilli into four sub-groups, containing 45.5 per cent., 32.6 per cent.,

12 per cent and 12 per cent respectively. The remaining three strains could not be placed in any of the above, so it seems that there is at least one other sub-group unidentified. It would also appear that sub-group 3 may be identical with that usually called the Y group of dysentery bacilli.

F. E. Taylor.

LOEWENTHAL (Waldemar) & BERTKAU. *Physiologische Agglutination von Y-Ruhrbazillen.*—*Cent. f. Bakt.* 1. Abt. Orig. 1919. July 23. Vol. 83. No. 4. pp. 314-332.

The researches on which this paper is based were carried out in 1912-1913, but their publication has been delayed on account of the war and other factors.

Formerly the specificity of agglutinins in the serum of dysenterics, both during the acute stage of the disease and during convalescence, was generally recognised and a positive agglutination of the Shiga-Kruse bacillus in a dilution of 1:50 and of the Flexner-Y bacillus in 1:100 was regarded as diagnostic.

During the war, however, the problem has altered so much that one can state with some assurance that the Widal reaction in dysentery cannot be compared in practical value to the similar one in enterica.

In 1911 Loewenthal found that 9.7 per cent. of normal sera in Berlin agglutinated Y bacilli in a dilution of 1:100, while for the inmates of a lunatic asylum, where dysentery was endemic, it was 20.7 per cent. The authors' experience in Serbia in 1915 bore this out and led him to regard the agglutination reaction as the endemic index of bacillary dysentery.

During the present research the material was obtained from women attending the Charité Hospital in Berlin. Out of 258, 6.5 per cent. gave positive reactions to the Y bacillus in 1:100, but the prostitutes and wet nurses gave a higher figure, 23 and 31 per cent. respectively.

Possibly in the case of the prostitutes the salvarsan treatment may have had some bearing, but this line was not followed up. The sera of wet nurses and maternity cases from another Institute gave as high a figure—26.9 per cent. positive to the Y bacillus. There is no proof that any of these women had ever suffered from dysentery.

Had the reaction anything to do with lactation, one would expect it to become more intense during the nursing state, but this does not appear to be the case.

The serum from 241 placentas gave a high percentage of positives, namely 38.58.

During pregnancy the agglutinins appear to increase especially towards the termination, but the serum of the foetus is apparently inert. The reaction with Y bacilli may then be regarded as a physiological one.

Whether there is a similar rise in the agglutinin content *vis à vis* other pathogenic bacteria—as for instance Shiga and enterica—is not yet clear, but so far as ascertained there is no appreciable rise in paratyphoid B agglutinins under similar conditions.

It must therefore be regarded as a phenomenon of paragglutination, as from Loewenthal's researches there is no proof that it is in any

way dependent upon the existence of *Y* bacilli in the body. A certain amount of evidence has been collected to prove the existence of a small amount of agglutinin in the sera of normal women and it is probable that these bodies become greatly augmented during pregnancy, possibly it has some connection with the abstraction of calcium salts from the body which takes place at this period. Calcium chloride added in low dilution to the serum would seem to diminish—as far as the not very extensive experimental data go—the agglutinating power. Colloidal silica, in a compound known as solmosil, in low dilutions has apparently no effect upon the agglutinins; on the other hand cholesterol in very low dilutions enhances the agglutination reaction and acts better in lower than in higher dilutions. The protocol obtained with specific high titre agglutinating *Y* sera both from the donkey and from the rabbit show this clearly. To summarize, the authors conclude they are justified in making the following statements

(1) The serum of women at the end of pregnancy agglutinates *Y* bacilli in a considerable proportion of cases.

(2) This increase in the agglutinin content corresponds with a similar increase in the cholesterol content of the serum.

It will be necessary to make many more investigations before this matter can be considered settled and the effect of other lipoids must be tried.

[It is very disconcerting to find these non-specific agglutinative phenomena which quite shake one's faith as to the true significance of the Widal reaction: for instance, the agglutination of typhoid bacilli by sera of miliary tubercle, the clumping of typhoid and paratyphoid bacilli occasionally by typhus sera, the Weil-Felix reaction in typhus, the occurrence of a positive Wassermann reaction in certain stages of scarlet and cerebro spinal fever; and to add to these anomalies we must now reckon upon pregnancy and apparently, from a statement the authors make at the end of the paper, malignant disease, as being in themselves capable of producing agglutinins specific for *Y* bacilli.]

P. H. M-B.

BURNET (Et.) & LEGROUX (R.). *Le diagnostic bactériologique de la dysenterie bacillaire.*—*Bull. Inst. Pasteur.* 1919. July 30. Vol. 13. No. 14. pp. 449-465.

This paper does not contain any new information, but devotes itself rather to a review of the recent activities of war-time bacteriologists in splitting up our sorely tried *Bacillus dysenteriae* and pays a considerable amount of attention to the so-called atypical forms.

The authors accept from the commencement that the bacillus of Flexner, Hiss and Strong and Saigon are separate entities, though it has generally been accepted by even the most advanced school and by Strong himself that the three first mentioned strains are identical.

It has been said, not without justification, that during the war the bacteriological diagnosis of bacillary dysentery was a failure and that in some cases it was not possible to isolate any organism

which conformed to any recognized type. Possibly this was in many ways due to the exigencies of war. Had more attention been paid to the technique of collecting and cultivating the stools and had some uniform system been adopted one wonders whether the variation in the results would have been as great as it is at present.

As regards Shiga's bacillus one is glad to see that there is a general consensus of opinion as to its position. It stands out amongst the rest, impregnable and inviolable, as performing its biological and serological reactions true to type; one is surprised to learn that certain strains ferment maltose if made up in a stronger solution than usual, i.e., 2.5 per cent. The essentially toxic nature of the bacillus is emphasized.

The second group includes the bacilli of Flexner, Strong, Hiss and Saigon, the group termed by KRUSE the *pseudodysenteries*. All are less virulent than Shiga; nor is the toxin they produce in any way comparable, for Shiga immune serum does not neutralize those produced by this group.

One point is stressed which has so far been seldom remarked upon in text books and that is the coagglutination existing between these two groups. Should the anti-Shiga serum be prepared from a horse it is found that it will agglutinate the pseudodysentery groups more strongly than it will the homologous organism; whereas a rabbit immune serum will agglutinate all the pseudodysentery bacilli as well but at a much less high titre than the horse serum. [N.B.— This has certainly not been the experience of the reviewer who has found the coagglutinabilities of rabbit immune serum to be very feeble.]

The agglutinability of the second group is such that they clump with normal human and horse sera. The reactions of these three pseudodysenteries with maltose is discussed though the authors recognise that this sugar is most unstable in its action. The variability of these sugar reactions has recently been accentuated by the work of MARTIN and WILLIAMS, nor according to the investigators does any univalent serum agglutinate all the strains which ferment mannite. According to LENTZ it is not a problem of splitting the carbohydrates alone, but different strains of pseudodysentery bacilli are capable of attacking the peptone in various ways thereby producing alkalies which mask the acid production from the carbohydrate, a character which can be inferred by the variability in the indol production by this group.

MURRAY's latest classification is quoted as follows:—

Class I, type Shiga.

Class II, type Schmitz, probably identical with *B. ambiguus* of ANDREWES.

Class III, Mannite-fermenters Flexner-Y, d'HÉRELLE, the para-Flexner of LANCHLIN & RIDEAU, groups 2.3.4. of SHIGA, the races G-L of OINO, and the strains designated A, B, C, D, by KRUSE.

Class IV comprises the group E of KRUSE, the *B. dispar* of ANDREWES and several bacilli isolated by BERTHELEIN; they are all lactose fermenters.

Schmitz's bacillus, it may be remarked, is said to be the connecting link between the acid and non-acid groups. None of these "pseudodysentery" bacilli can compare in toxicity with Shiga's bacillus. Now as regards the atypical dysentery bacilli their name

1 legion. One has only to mention the names of CASTELLANI, RUPPER and WILLMORE, MORGAN, ROUSSEL, BRÔLÉ, BARAT, MARIE and many others to know that there are still more atypical types which have been designated para-Hissés and para-Flexners.

As regards the diagnosis of bacillary dysentery, the following points are laid down:

(1) One must persist in one's search for the true Shiga bacilli and organisms belonging to the pseudodysentery group; examination must be made as early as possible in the disease and be repeated if negative.

(2) Consider the biological reactions as secondary, utilizing pure agar always made up with the same technique and similar proportion.

(3) The bacteriological diagnosis does not rest upon one cultural characteristic alone but on several.

(4) Failure to isolate a classical organism should lead one to test the agglutinability of the patient's serum towards several strains.

After the Albanian retreat of the Serbian army in 1916 the survivors in Corfu suffered from enteritis and dysentery of an undetermined nature, where amongst typhus, enteric and cholera one found sera which would agglutinate several pathogenic organisms. For instance, out of 100 cases

30	agglutinated Flexner	in 1:100
20	„ Shiga	„ 1:100
8	„ Gaertner	„ 1:1,000
4	„ Typhoid	„ 1:500

One is surprised to learn that amongst these stricken Serbs anti-dysenteric serum had no perceptible effect.

The final part of the paper concerns itself with the technique of culture and recognition of the bacilli. The importance of cultivating freshly passed stools early in the disease is emphasized, of which the primary microscopic examination for pus and macrophage cells should never be omitted; the more abundant they are the more likely is successful culture to be expected. The mucus may be washed in water before spreading on a lactose litmus medium; the resulting colonies can be recognised by preliminary and rapid agglutination with a specific serum. A whole colony can be emulsified and tried with Shiga serum, for instance, when macroscopic agglutination will take place within 5 minutes. The importance of rapid diagnosis is emphasized. A result may be thereby obtained within 15-16 hours. As regards the serodiagnosis, with the patient's serum, to make a positive diagnosis the minimal titre should be:

1/50 for Shiga.
1/150 „ Flexner-Y.

When this titre is not reached one must repeat the test at intervals of two days and trace the curve. Patients' sera with Flexner or Y dysentery do not agglutinate Shiga, but serum of a Shiga dysentery case *generally* agglutinates Flexner or Y (for example Shiga in 1:300, Flexner in 1:1,000). One has to distinguish the character of the agglutination. It should be coarse and in flakes, not fine and granular.

Certain strains of organisms are more readily agglutinated than others. By utilizing the absorption method the agglutinins for Flexner-Y are absorbed by saturating a Shiga serum with the

Shiga organism, whilst saturating a similar serum with Flexner-Y does not destroy or absorb the agglutinins to Shiga.

[Although there is much in this paper one can endorse, yet it does not appear that the problem is necessarily so complicated as is made out. One feels inclined to protest against the infinite subdivision to which the dysentery bacillus is being subjected. One feels that a disease with so characteristic symptomatology and pathology cannot be produced by so many varied organisms at different times and in different countries. As one who has had considerable experience in this matter the reviewer is inclined to believe that all these apparent discrepancies are capable of very simple explanation. If due attention is paid to technique and various factors which control successful isolation of the bacillus there will never be any difficulty in demonstrating either of the two classical types of dysentery bacilli. Difficulties in understanding this point are due, for the most part, to want of knowledge of the essential pathological processes going on in the intestinal mucosa as well as to the enthusiasm of the bacteriologist to establish a new species. One has always thought that it was the duty of bacteriology to simplify what appears to be a complicated problem, but in the case of dysentery its aim and object would seem to be the reverse. The time has now come to review the whole subject. Are we to acknowledge a score of dysentery bacilli or only two?]

P. H. M-B.

BIZZARRI (A.). Note batteriologiche sulla dissenteria bacillaro. [Observations on the Bacteriology of Bacillary Dysentery.]—*Riv. Cit. di Clin. Med.* 1919. Apl. 5. Vol. 20. No. 14. pp. 157-162. Apl. 12. No. 15. pp. 169-171.

An account of a research into the properties, biological and cultural, of bacilli found in the faeces of patients suffering from dysentery in the chief Military Hospital at Turin. The conclusions arrived at by the author as the result of his observations are thus stated:—

"It does not seem altogether an improbable view to suppose that many of the micro-organisms considered up to now as different types of the classical dysenteric bacillus may be in reality true Shiga, culturally anomalous, and that the relations between the various types with Shiga, as regards agglutinating and agglutinogenous properties, are but the expression of a fundamental biological unity, the differences being solely in cultural properties. This view does not of course exclude the existence of dysenteric bacilli allied to but distinct from the Shiga Kruse in biological as well as cultural properties and individualizable as species or varieties *per se*; the multiplicity of micro-organisms, however, considered to be factors in dysentery, which has rendered so complicated the bacteriological diagnosis of an affection which, clinically and from the point of view of pathological anatomy, constitutes a clearly defined unity, would seem to call, in the future, for the adoption of more rigorous criteria, since it is not impossible that the differentiation of individual aetiological agents has not always been based on the most important and fundamental biological characters.

The marked prevalence too of Shiga (or more rarely of Flexner) types noticed in many of the recent epidemics described both here and abroad and carefully studied by every method by LESIEUR, FLORAND, LANCELIN, MAGERHOFER and others lend support to these views and tend to produce a conviction if not of the unity, at least of the limitation in number, of aetiological agents in epidemic bacillary dysentery."

F. S. Arnold.

FROUIN (Albert) & MOUSSALI (Alexis). *Action des sels de terres rares sur les bacilles dysentériques.*—*C R. Soc. Biol.* 1919. July 26. Vol. 82. No. 24. pp. 973-975

Frouin and Moussali have latterly been investigating the action of certain rare metals, such as erbium, yttrium, lanthanum and thorium upon cultures and emulsions of pathogenic micro-organisms. In minimal amounts, 1:10,000-1:20,000, when added to culture media these favour rather than retard bacterial growth, but in higher concentrations they undoubtedly possess inhibitory powers. They have discovered the curious fact that the sulphates of erbium, lanthanum and yttrium in dilution of 1:10,000 possess the power of agglutinating suspensions of both Flexner and Shiga organisms, within two hours, but the salt of thorium is much less active in this respect.

The *bactericidal* action of the former three metals would appear to be an extremely feeble one; thorium sulphate alone being capable of sterilizing emulsions of dysentery organisms after an exposure for half an hour in a dilution of 1:100. However feeble the bactericidal action may be, the power exercised by lanthanum and thorium of detoxicating otherwise virulent cultures of Flexner organisms appears remarkable, on the other hand erbium and yttrium appear to be inert in this respect. These experiments were made with rabbit, and identical results were obtained with Shiga cultures.

The serum of these experimental rabbits developed agglutinins homologous to the organisms used for injection and it possessed moreover very definite curative properties. Therefore by utilizing thorium and lanthanum in this manner it is possible to immunize animals against dysentery organisms with great rapidity; both these salts possess marked bactericidal action and can be given by the mouth with safety and on these grounds the authors hope that they may be useful as a therapeutic agent in the treatment of bacillary dysentery.

P. H. M-B.

DISTASO (A.), GOODALL (Edwin) & SCHOLBERG (H. A.). *Agglutination Results with Certain Dysentery Organisms placed against Homologous and Heterologous Sera.*—*Jl. Path. & Bact.* 1919. May. Vol. 22. Nos. 3 & 4. pp. 257-261.

These observations were made at the laboratory of the Welsh Metropolitan War Hospital (Cardiff City Mental Hospital).

The purpose of the experiment was to ascertain whether killed cultures of various dysentery bacilli exhibited agglutination-phenomena in homologous and heterologous sera.

Six strains of Shiga bacilli were used, all of which gave classical biochemical reactions; of indol-producing Flexner organisms seven strains, and of Y and Strong 3 strains each; though it is generally admitted that those latter groups are closely allied to Flexner, yet all produced acid from maltose and no indol in peptone water. The macroscopic agglutination test was employed, with a suspension of the organisms killed by heat, 1,000,000,000 to the cc. of physiological saline. For final reading of the test, tubes were kept in the incubator at 37°·5 C. for 16–20 hours. In order to produce homologous sera 1,000,000,000 organisms were injected into the ear of a rabbit on two occasions at an interval of seven days, if no immune bodies were present in the blood at the end of that period further inoculations were carried out.

As a control an unknown organism which formed acid from the five sugars used and clotted milk was employed.

The authors' conclusions may be summarized as follows:—

Agglutinins are produced in an amount over 1:2,000 by 20 per cent. only of the organisms tested; by 25 per cent. for a dilution of 1:500; below that figure by fully 45 per cent. while 2 organisms—one an atypical Flexner, the other a typical Shiga—failed to produce any immunity response at all.

Those sera which agglutinate their homologous organisms in a dilution of 1:2,000 fail, for the most part, to agglutinate heterologous organisms.

The agglutinin produced by heterologous is the same as that produced by homologous organisms.

Two tables are given in support of these conclusions, though it must be admitted that both they and the style of the text are rather difficult to follow.

P. H. M-B.

SPEARES (J.) & DEBONO (P. P.). *Agglutination in Bacillary Dysentery.*—*Jl. Roy Army Med. Corps.* 1919. June. Vol. 32. No. 6. pp. 430–441.

In 1916 many cases of dysentery were admitted into Tigne Hospital, Malta, from Macedonia. In consequence of the considerable percentage of failures to isolate the infecting organisms in cases where the acute stage had passed an investigation of the agglutinating powers of the serum was made with the purpose of diagnosing these cases.

For diagnostic purposes Speares and Debono recommend the following procedure:—Strains of Shiga, Flexner and Y should be tested both against specific and normal sera. The strains selected are those giving the most marked agglutination with the former and least marked with the latter. These strains should not be subcultured more than once a month, and should be tested at intervals. Emulsions should be prepared, standardized and tested to determine the highest titre in which they are agglutinated by normal sera. Agglutination in double this titre can be considered specific for the strain used. In Shiga infections they found that a positive agglutination could be expected about the tenth day, with a gradual rise in titre thereafter. In Flexner infections a serological diagnosis is not always possible.

An infection of Shiga raises the titre for Flexner-Y. The administration of curative sera had no effect on the specific agglutination titre. In clinically mild cases with a clinical picture of bacillary dysentery, failure to obtain agglutination points to a Flexner-Y infection, whilst in other cases the infecting organism may be an atypical strain of dysenteric bacillus.

They found that agglutination in fairly high titre was constant in cases of dysenteric arthritis

F. E. T

MEDICAL RESEARCH COMMITTEE. National Health Insurance. A Contribution to the Study of Chronicity in Dysentery Carriers. [By William FLETCHER and Doris L. MACKINNON]—Special Report Series, No. 29. 31 pp. 1919 London. H.M. Stationery Office. [Price 9d. net.]

This report is based on the results of the investigation of 935 dysentery convalescents and 847 patients convalescent from other diseases admitted to the University War Hospital, Southampton, between May 1917 and May 1918. Of 229 dysentery convalescents 112 were convalescent from a first attack of dysentery, 29 had had 2 or 3 isolated attacks whilst 88 were chronic cases, and 61 were carriers of *B. dysenteriae* Flexner, 13 of *B. dysenteriae* Shiga and 122 of *E. histolytica* (9 of whom were also bacillary carriers). The majority of the long standing cases had been in the tropics or the near East. Most of the 88 chronic cases had suffered from recurrent attacks of dysentery over long periods and in these long established cases relapses were frequent; dysentery was thus a serious cause of inefficiency.

In the group of 935 dysentery convalescents 71 or 6.95 per cent. were carriers of dysentery bacilli, 26 or 2.78 per cent. being persistent carriers; 56 or 5.56 per cent. were Flexner carriers, 13 or 1.39 per cent. were Shiga carriers.

In the group of 847 non-dysentery convalescents there were 9 carriers of dysentery bacilli—all Flexner, and 6 of these gave a history of dysentery.

The 13 Shiga carriers were all persistent carriers and all suffered from chronic dysentery and mental depression and were unfit for work. 13 out of 61 Flexner carriers were persistent carriers, and with 2 exceptions were in fair health and fit for work under favourable conditions. Whilst the Shiga carriers came from tropical and sub-tropical countries the Flexner carriers came from France and from other theatres of war in approximately equal proportions. The infecting organisms were more constantly present in the faeces of Shiga carriers than in those of Flexner carriers. In fact, one of the chief characters of persistent infection with Flexner's bacillus is intermission, which renders the detection of a Flexner carrier a matter of difficulty and makes it almost impossible to say when a patient has ceased to be a carrier. A series of recommendations on the disposal of dysentery carriers in the Army concludes the Report.

F. E. T.

BANU (G.) & BARONI (W.). *Essais de bactériothérapie antidyssentérique.*
—*C.R. Soc. Biol.* 1919. June 7. Vol. 82 No. 17. pp.
621-622.

Following an epidemic of bacillary dysentery in the Roumanian army during the war, Banu and Baroni encountered 164 cases of chronic enteritis as a sequel to the acute phase of the disease against which specific therapy was absolutely valueless. The chronic enteritis lasted from 3 to 6 months during which time the patients' condition became steadily worse. No therapeutic treatment was of any avail and the mortality reached 78 per cent. Various complications such as nephritis, arthritis, phlebitis and peritonitis were observed.

Flexner bacilli were frequently recovered from the stools, occasionally Y and aberrant types, rarely Shiga which is seldom found in Roumania. Owing to the complete failure of ordinary therapeutic measures bacteriotherapy was tried. Vaccines were made from cultures of Flexner isolated from one of the cases, bacilli killed by heating to 56° C. as well as living bacilli being employed. Increasing doses were injected at intervals of 1 to 5 days, and to obtain a cure it was sufficient to give 6 injections of the killed vaccine followed by 1 injections of the living vaccine. After 3 doses improvement was noticed and cure was complete after the last dose. There were no recurrences. The mortality was reduced from 78 per cent. to 8 per cent. Reactions were no greater after injections of the living vaccine than after the killed vaccine. To obtain these satisfactory results the authors insist on the value of progressively increasing doses of living bacilli and that the vaccine treatment should be begun as soon after the commencement of the infection as possible.

F. E. T.

INGLIS (William Keith). *Bacillary Dysentery among British Troops in France, 1918.*—*Med. Jl. Australia.* 1919. Apl. 19. Vol. 1.
No. 16. pp. 313-314.

In August 1918, No. 3 Australian General Hospital was made the dysentery centre in the Abbeville area and in August and September 331 specimens were examined from 193 patients. Positive results were obtained from 27 patients (approximately 11 per cent.) almost equally divided between Flexner and Shiga. Of these 27 positive results 22 were obtained at the first examination. The percentage of positives was 21.5 in specimens containing blood and mucus, but only 6.6 in specimens containing mucus but no blood, whilst in 77 specimens containing neither blood nor mucus no positive results were obtained.

F. E. T.

JOB (E.) & HIRTZMANN (L.). *Dysenterie bacillaire et paludisme.*—*Bull. et Mém. Soc. Méd. Hôpit. de Paris*, 1919. July 17. Vol. 35.
No. 24. pp. 711-718.

This paper contains no new work, but details a number of military cases of bacillary dysentery, complicated as it is so often in N. Africa with malaria, in this case *Plasmodium vivax*.

P. IL. M-B.

MIXED AND UNCLASSIFIED DYSENTERY.

YASUDO (Shulzo). Diskussion über die Krankheitsursache der "Ekiri."
—*Verhandl. der Japan. Pathol. Gesellsch. Tokyo.* 1918. Apl.
Vol. 8. pp. 204-205.

ADACHI (Kiyohisa). Bakteriologische Befunde in den Mesenterial-Lymphdrüsen und der Milz bei "Ekiri," Kinder-Dysenterie und dergleichen Erkrankungen.—*Ibid* pp. 206-208.

SATOW (Tohru). Veränderungen der Milz bei Infektionskrankheiten, mit solchen der Milz von "Ekiri-Fällen" vergleichend studiert.—*Ibid.* pp. 198-199

"Ekiri" appears to be a disease closely allied to status lymphaticus with splenomegaly; the cause Yasudo thinks must be a bacillus, and, for reasons not stated, one allied to the dysentery bacillus.

Adachi associates the condition with bacillary dysentery in children and he has isolated from the enlarged mesenteric glands the dysentery bacillus in one case and *B. coli* in eight. From the spleen he also succeeded in isolating the dysentery bacillus in two cases and *B. coli* in eight.

Satow describes the character of the splenomegaly of "Ekiri" both from macroscopic and microscopic studies; he concludes that the character of the cell infiltration is more suggestive of a toxæmia than a bacillaemia.

P. H. M-B.

GROS (II.). *Le traitement des dysenteries chroniques.*—*Arch. Méd. et Pharm. Nav.* 1919. July. Vol. 108. No. 1. pp. 5-23

This paper is founded upon experiences of dysentery in Salonika. The author, who was in charge of an auxiliary naval hospital, thinks that if anything amoebic dysentery was more frequent than bacillary, though the latter was more common amongst the French, especially from October 1918 onwards, than it was amongst the Serbs. Besides *Trichomonas* (*Cercomonas*) and *Lambliæ* the author demonstrated intestinal spirochaetes similar to those of LE DANTEC in the stools.

One gathers that little reliance can be placed upon these all important protozoological and bacteriological examinations, as the conditions under which they were made were far from satisfactory—for instance the microscopical examination was not possible until some considerable time after the specimen had been passed. The author emphasizes the fact that, in dealing with dysenteries, in order that the microscopic diagnosis may be of any value whatever, the laboratory should be attached to the dysentery wards and be directed by an officer well versed in this branch of work.

The majority of the fatal cases were complicated by intercurrent disease, notably pneumonia and pulmonary tuberculosis. The ulceration of the small intestine in amoebic cases which had perforated was proved to be of tubercular origin.

Little information of value can be gathered from the postmortem records as, on account of the difficulties already mentioned, they have been classified on an aetiological basis. As regards treatment the author is loud in his praises of antidyenteric serum (Dopter);

the serum was given uniformly to all serious cases, apparently subcutaneously, and repeated daily as long as necessary in doses of 60 cc., directly on admission, and, wisely one thinks, without awaiting the pathological report. No unpleasant symptoms supervened. In this manner he obtained some veritable resurrections. In the treatment of amoebic dysentery he still considers ipecacuanha to be without a rival and points out, what is not generally appreciated, that the preparations of this drug from Brazil (*Psychotria ipecacuanha*) contain twice as much emetine as that from New Granada (*Urugoga granatensis*). After a considerable trial of emetine alone and in the form of the double iodide he prefers infusions of Brazilian ipecacuanha in 6 gramme doses which he makes up himself. With trypanblue by the mouth the results were not encouraging in amoebic dysentery and the same may be said for injections of galyol. Silver nitrate lavage in chronic cases (1:1000) seems to aggravate rather than ameliorate the symptoms. Opium should be given sparingly or not at all.

In fact the author's conclusions with reference to the treatment of chronic amoebiasis make rather sorry reading.

P. H. M-B.

LOEPPER (M.). [The Loss of Nourishment in Dysentery.] *Archives des Maladies de l'App Digestif*. Paris, 1919. May. Vol. 10. No. 3. p. 153. [Summarised in *Jl. Amer. Med. Assoc.* 1919. July. 26.]

Loepper concerns himself on purely theoretical grounds with the diet in dysentery. He thinks that the loss of mineral substances in the shape of iron in the multiple stools causes anaemia and prevents any regeneration of the red cells from taking place. The diet should be based upon a consideration of this loss and the body should be supplied as far as possible with the nitrogen, phosphorus and iron which it lacks.

P. H. M-B.

SANGIORGI (Giuseppe). **Rilevi fatti durante la campagna antidisenterica 1918 in Albania sulla microfauna intestinale di 2000 soldati.** [Observations made during the Campaign against Dysentery in Albania in 1918 on the Intestinal Microfauna of 2,000 Soldiers.] - *Giorn. di Med. Milit.* 1919. Aug. 1. Vol. 67. No. 8. pp. 939-944.

An account of a research made in Albania on the intestinal fauna of 2,000 soldiers, the great majority sufferers from intestinal disorders, and a comparison of its results with those of a previous research made by the same author in Venice on soldiers not so suffering. The Albanian research gave 657 cases of infection of which 482 cases were of infection by a single parasite, 151 double, 22 triple and 2 quadruple infections. The percentage of cases found infected was considerably higher in the Albanian than in the Venetian research, 32.8 and 21 respectively. A comparison of the two cases in respect of the particular parasites found shews that while, in Venice, innocuous forms prevailed (*Proteus*, *A. limax*, *Cercomonas*, &c.) in Albania on the other

hand the most frequent forms were the pathogenic and among them two that were not found at all in the Venice cases, *E. dysenteriae* and *Balantidium coli*.

Comparing the two cases in respect of type prevalence —

Venice.	Type group.	Albania.
13.9 % 13.1 %	Flagellata Rhizopoda	8.6 % 13.6 %

Thus a prevalence of flagellates at Venice and on the other hand, a marked prevalence of Rhizopods in Albania.

A notable feature is the preponderance of Blastocystis over other parasitic forms in Albania.

The author suggests that the preponderance of Rhizopods over Flagellates is due to a struggle for existence (*concurrentia vitale*). He finds that in mixed culture the flagellates die out after the second transplantation.

F. S. A.

POLLOCK (R.) & PICKARD (R. J.) Protozoal Infections of Intestines : with Emphasis on their Incidence and Behaviour in other than Tropical Regions and on the Pathogenicity and Treatment of certain of the Flagellates.—*Amer. Jl. Med. Sci.* 1919. Apl. Vol. 157. No. 4. p 492.

Owing to the frequency with which intestinal protozoa are found in the stools of patients other than dysenterics the authors advise a routine examination of the stools of all patients suffering from abdominal complaints of doubtful origin. They believe that some of the flagellates are pathogenic. For treatment of intestinal protozoal conditions they recommend the use of emetine hypodermically and Arsphenamin intravenously.

F. W. O'G.

SMITHIES (Frank). The Frequency of Protozoic Enterocolitis in the Middle West: Clinical Manifestations, Diagnosis, Treatment.—*Amer. Jl. Med. Sci.* 1918. Aug. Vol. 156 No. 2. pp. 173-184.

Analyses of 1,000 stools resulted in the finding of protozoa in 93 instances. "*Cercomonas-intestinalis hominis*" seems to have been the most frequently found flagellate. Emetine for entamoebae, calomel for flagellates or thymol for both are recommended as forms of treatment.

F. W. O'G.

MATTHEWS (J. R.) & SMITH (A. Malins). The Intestinal Protozoal Infections among Convalescent Dysenterics examined at the Liverpool School of Tropical Medicine. (Third Report.)—*Ann. Trop. Med. & Parasit.* 1919. May 12. Vol. 13. No. 1. pp. 83-90.

In this report the examination of 2,355 cases for intestinal protozoa is considered. Most of the patients were returned from France. The histories before going to France were not easily obtained.

1,158 were found to be infected with protozoa. The results of the examinations are set down in Tables. The *E. histolytica* incidence was slightly higher than in a previously published series, due probably to the facts that in the present series a greater number of examinations were made in each case and to the non-recognition before 1917 of cysts less than 10 μ being associated with the pathogenic amoeba. At the end of the paper a table showing the results of examinations on 23,024 occasions from 4,068 cases, since May 1916, is given.

F. W. O'C.

MATTHEWS (J. R.) & SMITH (A. Malins). **The Spread and Incidence of Intestinal Protozoal Infections in the Population of Great Britain. IV. Asylum Patients. V. University and School Cadets.** *Ann. Trop. Med. & Parasit.* 1919. May 12. Vol. 13. No. 1. pp. 91-94.

The stools of 207 Asylum male patients ranging in age from 17-87 years with average 48 were examined for Protozoa; a single examination was made in each case. *E. histolytica* was found in 9.7 per cent, *E. coli* in 15.9 per cent, *E. nana* in 12.1 per cent, *Giardia intestinalis* in 3.4 per cent, and *Chilomastix mesnili* in 23.2 per cent. The infections were higher than in other series of examinations with the exception of *Giardia intestinalis* which are lower than in other groups.

Only 41 University and School Cadets were examined. The same protozoa were found as amongst other series but the number of cases recorded is too small to allow of conclusions being drawn as to incidence amongst this higher social class.

F. W. O'C.

HUGHES (T. A.). **Results of Microscopic Examination of the Stools of Five Hundred East African Natives not suffering from Intestinal Diseases.**—*Indian Med. Gaz.* 1919. Apl. Vol. 54. No. 4. pp. 139-140.

These examinations were made in native porters during the East African campaign. Bacillary dysentery, as elsewhere, was the predominating variety. The diagnosis of amoebic dysentery was made upon characters of the vegetative forms (ingestion of red cells) and size and characters of cysts. Two preparations were made from each stool and emulsified in Gram's iodine of double strength. *Entamoeba histolytica* occurred in 11.2 per cent.

P. H. M-B.

MANTOVANI (M.). [Intestinal Lamblasis.]—*Gaz. Ospedale e d. Clin.* 1919. Jan. 30. Vol. 40. No. 9. p. 66.

The author does not consider that Lamblia is a cause of dysentery but he believes that it may produce a sub-acute enteritis manifested by chronic diarrhoea of very persistent type and resistant to treatment. Some cases are recorded of progressive debility terminating in death. The disease was attributed by the author to the action of the parasite. Arsphenamin by its action in improving the general health gave better results than any other form of treatment tried. There was no evidence that the drug exercised any action on the parasites.

F. W. O'C.

WEL. (Mathieu-Pierre) & BERGOUIGNAN (Paul). *Sur un cas de dysenterie balantidienne autochtone.*—*Paris Méd* 1919. Jan 25. Vol. 9. No 4. pp. 76-78.

The majority of indigenous cases of balantidiasis of European origin have occurred in the districts bordering on the Gulf of Bothnia and Finland.

Cases have been reported from Russia, Scandinavia, Finland, Westphalia, Saxony, Austria, Holland, Italy, Siberia, China, Philippines, Siam, Egypt and the Soudan, North America, Porto Rico, Brazil and Cuba.

The case of balantidiasis detailed in this paper would appear to be the first authentic indigenous case reported from France. The patient was a soldier at Rennes; the diarrhoea appears to have been a moderate one, five or six liquid stools a day without the addition of blood. The general condition was good and there was no emaciation.

Balantidia were numerous—one in every field of the oil immersion lens. There was an eosinophilia of 4.7 per cent, and a reduction of the haemoglobin content to 70 per cent. The absence of any dysenteric symptoms, or abdominal pains, suggestive of an intestinal ulceration were the chief features.

Balantidia may persist in the stools for as many as twenty years (BELFRAGE).

P. H. M-B.

PAEZ (Felix R.). *La disenteria balantidiana en Venezuela.* [Balantidian Dysentery in Venezuela.]—pp. 8. 1919. Ciudad Bolivar. Venezuela: Tip la Empresa & E. Suegart.

Notes of two cases of dysentery in which numerous *Balantidium coli* were found on microscopic examination of the faeces. Ova of *Ancylostoma* and *Trichocephalus* were also found in both cases. The dysentery yielded to irrigations of quinine hydrochloride. Both patients died, however, one of influenzal broncho-pneumonia 16 days after the cessation of dysenteric symptoms and the other of profound and intractable adynamia.

F. S. A.

BRENNER. *Ueber Balantidien-Enteritis und ihre Behandlung.*—*Munch. Med. Woch.* 1919. May 30. Vol. 66. No. 22. pp. 587-589.

This paper deals with four cases of balantidial dysentery all of which appear to have originated in Germany and of which no less than three had had intimate association with pigs, from whom presumably they contracted the infection. In all four cases the stools consisted of liquid yellowish-brown homogeneous faeces, in general appearance quite characteristic. In one case only was blood apparent. All the patients were debilitated and emaciated. The patients improved and the balantidia disappeared from the faeces after exhibition of ipecacuanha administered according to MANSON's method. The powdered ipecacuanha root is given in 1 gramme doses and the total amount in each case averaged 10-12 grammes.

P. H. M-B.

MASON (C. W.). A Case of *Balantidium coli* Dysentery.—*Jl. Parasit.* 1919. Mch. Vol. 5. No 3 pp. 137-138.

Following a review of cases of balantidiasis recorded in the past, including abstracts from WALKER's paper on experimental balantidiasis, the author describes a case of infection with *Balantidium coli* accompanied by dysenteric symptoms in a Danish missionary. Numerous balantidia were found in the stools. The case was treated with 60 minims of oil of *Chenopodium* in half an ounce of olive oil introduced per rectum on the first, third and sixth days after the diagnosis was made. Following the first enema the stools became faecal in character and the patient ceased to complain of symptoms. The stools were controlled for some weeks after the third injection but no parasites were found. The writer thinks it possible that a relapse may yet occur, but he considers the results of this treatment sufficiently striking to act as a basis for further investigation on similar lines.

F. W. O'U.

COWAN (John) The Aftermath of Malaria and Dysentery.—*Glasgow Med Jl*, 1919. Aug. Vol 92. (Vol 10) pp 65-74. With 2 Charts

Deals with both diseases in a general way. It is full of sound advice but contains nothing of importance to tropical workers.

P. H. M-B.

SPRUE.

WOOD (Edward J.) **The Recognition of Tropical Sprue in the United States** *Jl. Amer. Med. Assoc.* 1919 July 19 Vol. 73. No. 3 pp. 165-168

Sprue undoubtedly exists in the United States; the majority of cases occur in the Southern districts, though one of Wood's cases originated in New Hampshire.

No difficulty should exist in distinguishing the sprue tongue from that of pellagra, in the latter disease it is more pointed and not so flabby. The large size of the stool and the deficiency in absorption of hydrolyzed fat suggests an implication of the pancreas. PRATT & SPOONER's analyses show a fat loss of 15 per cent and a nitrogen deficit of 15 per cent. The anaemia of sprue, as has often been remarked, resembles that of pernicious anaemia, a matter of practical interest as that disease may be mistaken for sprue and sprue for it; it may be possibly the result of a secondary *B. coli* infection as CHARLTON has suggested. It is to be hoped that a more accurate study of sprue anaemia will shed some light on the dark corners of the Addisonian disease.

In the discussion of the paper Drs. VANDERHOOF and PRATT indicated the points of resemblance between the sprue achylia and pancreatic disease; ALVAREZ of San Francisco expressed his belief in the value of a strawberry diet, while LUBMAN of New York believed that the discovery of the etiology of sprue will clear up the vexed question of the pathogenesis of pernicious anaemia. GRAVES of Texas is of the opinion that sprue is becoming endemic in the United States and LIVINGSTON thinks that betanaphthol may prove to be a cure for the disease.

P. H. M-B.

WOOD (H. J.). **The Clinical Manifestations of Tropical Sprue.**—*U.S. Naval Med. Bull.* 1919. July. Vol. 13. No. 3. pp. 449-453.

Since 1915 the number of cases of sprue recognised in the Southern States has increased. It is still being generally confused with pellagra, though the absence of any skin manifestations and grave degree of anaemia, so characteristic of the former disease, ought not to lead to confusion. The mouth condition differs in the two diseases. In pellagra there is marked salivation and the tongue is of a carmine tint. The suffering of a pellagrum from mouth symptoms may be very severe. The stools of pellagra are very different from those of sprue; they are liquid, usually more frequent and may occur at any time. In sprue they are large, frothy and occur more frequently in the early hours of the day. The aplastic anaemia of sprue is not found in pellagra.

P. H. M-B.

BOOK REVIEWS.

MALDEN (Frank Cole) [O.B.E., M.D. Melb., F.R.C.S. Eng., Professor of Surgery in the Egyptian Government School of Medicine]
The Surgery of Egypt.—pp. xxviii + 394 With 63 plates & 3 text figs 1919 Cairo. Printed at the Nile Mission Press
 [Price not stated]

As the author states, this book is intended primarily as a guide to surgeons in Egypt, supplementing the standard works on surgery and being so arranged that it can be studied, chapter by chapter, in conjunction with the "Manual of Surgery," by ROSE & CARLESS.

The book, however, will appeal not only to those who practise in Egypt, but to workers throughout the tropics as it contains much valuable information dealing with surgical procedure in hot countries and with diseases having a far wider distribution than the Valley of the Nile. Of special interest are the records of 43 splenectomies, with nine deaths directly or indirectly due to operation. In two instances after splenectomy the patients suffered from relapses of malaria while still in hospital, it being recorded of one that "his convalescence has been retarded by an attack of quaitan malaria to which he is subject, though no blood changes could be detected before operation," and of the other that "the patient had a history of recent malaria and subsequently had repeated attacks, during which the blood showed a severe double infection with benign tertian parasites." The condition of Egyptian splenomegaly for which these operations were performed is described in full and corresponds closely to other accounts of Banti's disease—splenic enlargement, hepatic cirrhosis, ascites, leucopenia—the patient usually being over 25 years of age, though there is reason to believe that in many instances the condition originates in childhood. In some cases the course was prolonged and one is noted where the interval between the onset of symptoms and appearance of ascites amounted to 15 years. Varying degrees of irregular pyrexia are also recorded and allusion is made to the fact that a double remission may occur during 24 hours. The importance of this condition can be judged from the fact that "it is found in an easily recognisable form in no less than 10 per cent. of autopsies performed at Kasr-el-Ainy." Its nature, however, is but little understood and neither causal agent nor method of transmission is known. That splenectomy in properly chosen cases has proved of lasting benefit cannot be doubted in view of the evidence given, and useful information for the guidance of the surgeon in the selection of his cases is included at the end of this section.

That schistosomiasis, or as it is here called bilharziosis, should play a large part in the book is only natural and the author's 20 years experience of its surgical treatment forms the basis for much sound advice. The subject affords an opportunity for the introduction of a short history of the School of Medicine in Cairo, the account being largely drawn from SANDWITH'S History of Kasr-el-Ainy, and we are told how the French under Napoleon Bonaparte "turned Kasr-el-Ainy into a hospital and apparently fortified it by a surrounding wall," how the great LAMARCA studied there, and how in 1827 the Frenchman GROS BEY established a medical school which, in 10 years, trained 420 medical officers for the army and navy of Mohamed Aly. In 1850 German professors supplanted the French and among them came Theodore BRUNZ from Kiel, who announced his discovery of the *Distoma haematobium* in 1851. The Italians succeeded the Germans and in 1855 the medical school was suppressed on the ground that it had become a trade there to deliver fraudulent certificates of ill health with a view to exempting the fellaheen from military service.

Bearing these facts in mind the photographs used as illustrations throughout the book which, in many instances, depict the most advanced stages of disease, are easier to appreciate; we see why neglected disease is prevalent, and in this way the Surgery of Egypt does much to support BALFOUR'S campaign for a Ministry of Health, which shall take in hand the prevention of the preventable and the education of a people largely suffering from

their lack of knowledge. This historical sketch and the life history of the worm that introduced it come into the section dealing with Diseases of the Abdomen, which, in turn, is followed by a section entitled Hernia, after which we return to a consideration of bilharzial infestations under the heading Diseases of the Rectum and Anus. In this last section is included a discussion of the general symptoms due to invasion by the worm and information concerning the implication of the urinary tract; a consideration of piles and prolapse of the rectum follows, when we once again find ourselves studying bilharziosis as it affects the bladder. It is a little difficult to believe that by such an arrangement a student will ever obtain a clear picture of schistosomiasis as a whole, though the fault must rather be laid at the door of ROSE and CHARLES than attributed to Madden. This regional classification of disease maintains throughout the book and though it may facilitate ready reference to surgical technique it is unlikely to lead to clear thinking in connection with the morbid processes which render surgical treatment necessary. Tubercle is another case in point and allusion to the disease recurs throughout the various sections. When dealing with the peculiar susceptibility to tubercle of the Sudanese in Egypt the author lays stress on the effects of unaccustomed cold, in what to these people is a northern clime, forgetting that their resistance to the infection is equally slight in their own homes. That they are susceptible because the disease is new to them and because no racial immunity has yet been induced, and that climate *per se* plays practically no part is a point which he has failed to make.

When the next edition of the Surgery of Egypt is under consideration it would probably be well to forget its past tradition, cut its connection with any other textbook, make it complete in itself, revise its arrangement, eliminate as far as possible the regional and symptomatic classification of disease, correct such errors as that seen in the description of the cercaria of *Schistosomum mansoni* which is described as having "two eye spots and cuticular keels along the hind portions of the tail," condense its information and allow it the inestimable advantage of publication in a country where the difficulties of the press are fewer than in Cairo.

W. BYAM.

HINTON (M. A. C.) **Rats and Mice as Enemies of Mankind.** Economic Series No. 8. British Museum (Natural History). With 2 plates and 6 text-figs. x+63 pp. 1918. London: Printed by Order of the Trustees of the British Museum. [Price 1s.]

The objects of this pamphlet, as given in the preface, are to "give a brief account of these noxious animals, their habits and breeding; to deal with their economic importance and relations to the public health; and to suggest measures by which they can be controlled, if not exterminated." The species whose appearance and habits are described, are *Rattus rattus*, the black rat or ship rat, *Rattus norvegicus*, the common or brown rat, and *Mus musculus*, all of Asiatic origin and introduced into Europe at various dates. In his advice to protect stoats and weasels the author appears to come up against gamekeepers and others who hold contrary views, but he gives a reasoned support to his opinion. For those who wish to know more of the structure and classification of the *Muridae* there is an appendix with several illustrations. The pamphlet is well written and well arranged, and should have a large circulation.

A. G. B.

TROPICAL DISEASES BUREAU.

TROPICAL DISEASES
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[No. 6.]

APPLIED HYGIENE IN THE TROPICS.

By COLONEL W. G. KING, C.I.E., I.M.S. (Retired).

REPORTS.

MONTSERRAT (1918).

According to the Annual Medical and Sanitary Report on Montserrat for 1918, yaws is still common but has "undergone a great decrease in number of cases", intramuscular injection of Kharasivan has been used successfully. 370 persons were examined for ancylostomes, of whom one-third were found infected; none of these were whites. *Ascaris lumbricoides* and *Trichocephalus dispar* were "almost universal in black children and adults"; *Strongyloides intestinalis* was not so frequent. Malaria is said to be unknown except in imported cases; filariasis is occasional and dysentery exists in certain of the country districts. The following remarks as to sanitation are obviously made with due regard to local susceptibilities:—

"The public market might be improved, but I believe that its removal comes within the scheme for the Town Improvement. . . . An Ordinance to regulate bakeries has been under consideration but has not yet been brought into force. It seems to be needed. . . . The Anti-mosquito Regulations apparently remain where they have been for some years past. Without a staff engaged solely on sanitary work, they may as well remain in abeyance."

CAIRO (1915 AND 1916).

The sanitarian who has the misfortune to render an annual report in which he can testify to no sanitary advance achieved, is driven to the distasteful task of merely recording the mortality of diseases he knows can be prevented and which, doubtless, he has done his best to persuade the public purse-holders should be prevented. This has the merit of narrowing his task and if the figures and facts which he has accumulated affecting the population under his sanitary care be available, there need be demanded little toil in compiling a record of a year's work. But should statistical data be incomplete owing to imperfect methods of registration, and he be beset with a sense of duty towards epidemiological science, or the tracing to their source

of the foci of disease (with the ever-present hope that his oft-pressed reforms may pass beyond the stage of "under consideration") there is left for him a severe tussle that his conscience may be satisfied that he has done his duty under adverse conditions. A case apparently in point is the Report of the Medical Officer of Health of Cairo for the years 1915 and 1916. It is obvious from beginning to the end of this Report that whilst he has maintained a discreet silence in reference to meagre staffs and sanitary circumstances of the City, he has struggled with imperfect statistical data to secure a correct classification of the diseases to which the population is subject. The course he has pursued has the merit (in the absence of power to describe the effect of sanitary schemes carried out during the year) of at least disclosing the causes of mortality, and thus paving the way for the introduction of improvements of the requisite character in the future.

Dr. A. BALFOUR, C.B., in his Chadwick Lectures on "The Problem of Hygiene in Egypt" (*Lancet*, 1919, Sept. 6, 13 and 20), has described the insanitary conditions of the old City of Cairo, and gives hopes of a better future "thanks to hard work on the part of a very capable Medical Officer of Health"; but the heaviness of the task before this officer is shown by the limitation that things have been altered for the better "in certain localities," that there is a "partial completion of the great drainage scheme" [discussed in the early nineties] and that as to a public water supply, a large installation of mechanical filters exists—"but it is not to any extent at the service of the poorer [and presumably the more insanitary] parts of the population."

It will thus be seen that not only is the Medical Officer of Health of Cairo trammelled by being called upon to deal with imperfect statistics, but has to deal with a city long notorious for its heavy mortality where, up to date, the best that can be said of sanitary improvements of a communal nature is that they must be classed as "partial."

Dr. Ferguson LEES deals with two annual periods—1915 and 1916. In 1915, in a population of 733,423 (estimated) of Cairo there was a greater death rate than birth rate, namely, 44·3 per mille against 40·8 per mille—the latter however being marred by an infantile death rate of 320 per mille of births; in 1916, an improvement was exhibited—the death rate was 38·3, birth rate 42·1, and the infantile death rate 295. In the former year, 11,422 cases of infectious diseases were recorded; by exclusion of figures referring to British troops, he arrives at 9,456 as the number of infectious cases in the civil population. 3,303 cases diagnosed originally as typhoid, he deletes under that head, as "subsequent investigation led to a change of diagnosis"; and he finally estimates the number of typhoid cases at 2,378, which is sufficiently appalling in the present day. In 1916, in an estimated mid-year population of 740,000, he places the total typhoid cases at 1,462, relapsing fever 1,035, typhus 1,858, smallpox 277; whilst diphtheria, measles and cerebro-spinal fever swelled an admitted total of 6,771 cases of infectious diseases—at an incidence rate of 9·15 and, a death rate of 3·83 per mille of the population. In the 1915 figures, the 3,303 cases held after investigation not to be typhoid he decides to refer to as "unidentified fever."

The etiology of this new factor in the epidemiology of Cairo, Dr. Ferguson Lees treats in Appendix C—page 104 of his Report. It

would be out of place in the Sanitation No. of this *Bulletin* to follow fully his description of the clinical symptoms of this fever, it suffices to state that it was found to be of a "highly infectious nature"—the mode of transmission was not ascertained; the incubation period (as found experimentally on monkeys) varied between four and eighteen days. In 27 per cent of cases, there was "cutaneous mottling of a roseolar or petechial rash." From the onset the rise of temperature was gradual—followed by lysis—duration varied between seven days and several weeks—the mortality was 22·38 per cent. of cases. Nervous symptoms were "persistent and severe." Laboratory tests for Widal's reaction and for the typhoid bacillus in blood, urine and stools proved negative. Dr Ferguson Lees concludes his description of this disease by stating:—

"I am inclined to the belief that the disease was truly the result of some new infection, probably introduced into this country through the agency of those troops of varied races, and of the most diverse origin, which were then being poured into this country, and to attribute the high infectivity shown by the disease to the absence of any racial insusceptibility such as would have existed had the disease been previously prevalent in this country."

DISEASE PREVENTION.

MALARIA.

Irrigation.

A shortage of water for irrigation purposes may, in the tropics, result in the chronic starvation of thousands; a waste of water by excess distribution over agricultural necessities may, in spite of plentiful food crops, bring death to multiples of thousands by aiding the spread of cholera and malaria. It is in the interests therefore of the economy of the huge funds usually necessary for securing irrigation facilities, as well as of the agriculturist who looks for remunerative crops, and of the sanitarian who not only concerns himself with sanitary conditions within an irrigated locality but is the guardian of health conditions of inhabitants of areas adjacent to it, that waste of irrigation water shall not occur. It is proverbial that, in the absence of an epidemic, it requires ten years preliminary contemplation to cause a public authority to adopt a manifestly necessary sanitary measure; but the case of individuals is, under certain circumstances, more hopeful. A sanitary remedy which happens to involve a pecuniary benefit to the individual requires from the sanitarian a minimum of persuasive oratory. Hence, it is well that when attempting to convince his hearers of the benefit of curtailing useless pools, the sanitarian should strengthen his malaria prevention arguments by an appeal to facts showing the successful use of limited irrigation for agricultural purposes. In the following quotation from the *Scientific Reports of the Agricultural Research Institute, Pusa*, for 1917-18 (p. 56 & 58-59) will be found no mere statement of theory but the results of prolonged investigation and practical experiments on this subject:—

"In the Quetta valley the texture of the soil is such that after surface flooding ventilation is very easily impeded, with disastrous results to the crops. The investigation of this matter led to the recognition of the importance of soil aeration in garden or crop production, and to the working out of an improved system of irrigation, which, if adopted in India generally, would bring in every year an additional revenue of £5,000,000—enough to pay the interest on the War Loan. . . . The existence of soil aeration factor furnishes the explanation of the low yields of poor quality which always follow over-irrigation on silt-like soils. The texture of these soils deteriorates after being flooded with water. As the soil dries under the hot sun, the surface bakes into a hard crust largely impermeable to air. That the crust is impermeable can be seen by immersing in water a portion of this hardened soil after irrigation. The air escapes sideways—not through the surface skin. Each successive irrigation destroys the soil texture more and more, and the surface crust becomes more and more impermeable to air. The effect of irrigation on alluvial soils therefore interferes with its ventilation. The process removes one limiting factor, the want of water, but it introduces another, namely, the need of aeration."

In experiments in three different stations "One irrigation gave nearly ten maunds of wheat to the acre; two gave a little over sixteen, while three reduced the yield appreciably."

Drugs or Drainage.

The employment of quinine for prophylactic and curative purposes connotes anti-malaria measures possessed of usefulness, but as such efforts are simply palliative and are decidedly expensive when long continued, they should be classed as merely makeshift or adjuvant. Ten years back there arose a school of malaria experts which would get rid of malaria by issue of quinine to populations, they assumed that, by encouraging advance in education, the formation of public opinion would follow—so pronounced a nature that the people would take upon themselves the yoke of local taxation, and carry out such anti-malaria measures as an academic education had brought home to them. Sir Ronald Ross, about that period, put it on record that he had inspected schools where the anxiety as to the history of the Plantagenets was more in evidence than as to the causation of the enlarged spleens from which the scholars suffered. These malaria experts temporized with individualistic methods in favour of ill-conceived economy of public funds, whilst mortality progressed which could have been cut short by communal schemes—founded on practical demonstration of mosquito control by appropriate methods of removal of moisture surplus to plant requirements. Were it possible to collate figures showing cost (including loss of producers of a population and of products) in areas where solely this quinine and academic education policy has been attempted, there can be little doubt that sanitary education by demonstration, by means of carefully executed anti-malaria works, would henceforth secure much more whole-hearted support by the finance departments of Public Bodies than at present. This view, of which illustrations from practice of various authorities have been given in this *Bulletin* from time to time, is also held by Asst. Surgeon-General CARTER of the U.S. Public Health Service, but is handled in so original a manner as not only to bring with it conviction to the reader because he appeals to personal experience, but also to extort a confirmatory smile. After reciting a summary of acknowledged anti-malaria measures, he states definitely, "I count drainage—especially tile drainage—the key of the rural malaria problem." He then supports this and other radical measures of mosquito control as follows:—

"In my opinion, whenever the control of anopheles production is not prohibited by the cost, it is the method of choice. It has these advantages—

(1) The main work is done once for all, and the upkeep is usually small.
 (2) The work is done with materials—earth, water, etc.—and not with people. *Health officers will know that no material is so refractory to work with as people.* [Italics not in the original.]

(3) Both the installation and upkeep are carried out directly under the supervision of the health officer, and the result cannot be vitiated by individual carelessness, crankiness or bad faith." (*Public Health Reps.* 1919. Aug. 22. Vol. 34. No. 34. p. 1931.)

Mosquito Reduction in Freetown.

Freetown is not yet free of malaria. In the Annual Report on the Medical Dept., Sierra Leone, for 1917 (p. 48), the Senior Sanitary Officer, Dr. R. LAURIE, whilst of opinion that the children's teachers in schools were less frequently than in 1916 off-duty on account of attacks of malarial fever, states that he considers the absence of continuous

effort has been inimical to success and adds, "it is to be deplored that since the great anti-mosquito campaign carried out by Sir Ronald Ross about 18 years ago in Freetown, the work of mosquito reduction by special men appointed for the purpose was not continued." Dr H. TWEEDY, the Principal Medical Officer, reports that in 1197 blood examinations made in the Laboratory at Freetown the following results were obtained:—Subtertian, 293; subtertian and crescents, 4, crescents alone, 9; benign tertian, 16, quartan, 4.

Mrs. CONNALL, wife of the Director of the Medical Research Institute, Nigeria, is reported to have identified the following mosquitoes sent to her from Freetown, the larvae of which "associated in various ways, were found in trees, boats, bottles, tanks, tins, drums, pots, holes in rock, etc.; they are arranged in order of frequency:—

Stegomyia fasciata; *Culiseta nebulosa*; *Stegomyia aegypti*; *S. luteocephala*; *Ochlerotatus apicomaculatus*; *Culex deaneus*; *O. duttoni*; *Eretmopodites chrysogaster*; *Culex ligypus*; *Anopheles costalis*; *Eretmopodites quinquevittatus*; *Culex thalassius*; *C. invidiosus*; *Ochlerotatus irritans*; *Tororhynchites brevipalpis*; *Stegomyia pseudonigeria*; *S. africana*; *Eretmopodites adipodius*; *Culex grahami*; *Ochlerotatus omeshcus*; *O. marshalli*; *Stegomyia metallicus*; *Culex fatigans*; *Ochlerotatus argentopunctatus*.

Dr. R. Laurie makes observations on the subject at page 50 of the Annual Report of the Medical Department, Sierra Leone:—

"Most of the above mosquitoes were collected during the rains, and groups of as many as 40 or more were sent for identification, but in cases where the larvae were few in number or of one variety, sometimes as few as two or three only were forwarded.

"The number of anophelines, according to this table, appears to be low, and so it is, for when anophelines are associated with other larvae, the former seem to be preyed upon by the latter if the specimens are kept "in vitro" for any length of time, and, in the rains, many anopheline larvae get washed out of the breeding places, so it happens that most of them are discovered in the end of the rains, and then also the number of cases of Malaria are found to increase. Special precautions were, however, taken to collect anophelines when hatched out, and I am much indebted to Mrs. Connal and Dr. Connal, of the Medical Research Institute in Nigeria, for their great kindness and interest taken in the identification of mosquitoes, which I had sent to them from this Colony, and to Mr. Bowen, Superintendent Sanitary Inspector, who took special pains in preparing them for dispatch. The collections identified, embracing only a small proportion of the numbers discovered, cover a period of four months and are fairly representative, I think, of the mosquitoes found in Sierra Leone, and Mrs. Connal commented on the fact that *O. marshalli* had not been previously described from West Africa, although found in Rhodesia, nor *Culex fatigans* from Sierra Leone. It was also the first time that *Eretmopodites quinquevittatus* and *Eretmopodites chrysogaster* had been sent to her. The *Tororhynchites*, she declared, were the best specimens she had received, but there are many of them in this colony, though they are becoming scarcer now."

YELLOW FEVER.

In his Report for 1917 embodied in the Annual Report on the Medical Dept., Sierra Leone, Dr. R. LAURIE, the Senior Sanitary Officer, gives the following opinion as to conditions favouring the spread of yellow fever on the West Coast of Africa:—

"Yellow Fever was reported from Bathurst, Porto Novo, Lagos, Accra, Jalingo in Northern Nigeria, Matadi in the Congo Free State, Forcados, Coomassie and Bonny, and four cases occurred among Europeans in Sierra

Leone, showing that this disease is widely distributed along the coast, and that the necessary facilities exist for its propagation and spread.”*

He points out that *Stegomyia* can be found in great abundance, *Stegomyia fasciata* greatly preponderating, in the Colony and Protectorate and that although “Freetown need not be regarded as an endemic focus,” he concludes that “it would not be wise to assume that the disease is not endemic in the Protectorate, at least, not until such time as it is clearly proved not to be so” Along the line of railway and lines of communication generally it has been found that *Stegomyia fasciata* are common in villages, and some of these “have a definite history of yellow fever and African or Blackwater Fever, extending over such periods of time as Europeans have been resident in or near them; it is this which gives the impression that there are Yellow Fever endemic foci in the Protectorate.” Efforts are being made to improve the sanitary condition of these villages, and the Governor has asked that a scheme be drawn up for the training of Travelling Sanitary Inspectors who should be appointed to Sections of the Railway so as to be consistently employed going from village to village. One such Inspector has already been appointed. Dr. Laurie concludes his remarks on this subject as follows:—

“In a campaign against any kind of mosquito-borne disease, it would seem to be a great mistake to concentrate one’s attention on one variety of mosquito to the exclusion of others, which may be more numerous, and if neglected may be the means of setting up a more violent epidemic in this country than that which it is one’s immediate object to suppress.”

CHOLERA.

The Bulletin of the “*Office International d’Hygiène Publique*,” for June of this year, quotes (p. 879) a paper by Lt.-Col. GREIG, I.M.S., the British India delegate with the Sanitary Commission of the Allied Countries. This affords an excellent résumé of the present conception of the etiology of cholera. Col. Greig’s original research work, by which it has been possible in recent times to recognize with greater clearness the factors concerned, necessarily bulks largely in the account. The main object of the paper is apparently to press the importance of international preventive action having regard to the ever-increasing rapidity of transport generally—not forgetting the probable future large use of transport by air. As showing the gravity of communication with the East, he states that in the period 1900 to 1912 the least number of deaths in India by cholera in one year (1904) was 193,457, and the maximum 850,984 (1900). Of course the necessity for observation or surveillance of travellers—more especially those great spreaders of cholera—pilgrims—has been long recognized, but a period of ten days after convalescence from an attack was ordinarily deemed sufficient to credit the sufferer with a return to the normal condition of intestine. Col. Greig’s discovery however of the persistence of the cholera vibrio in the gall bladder for long periods alters conditions under which

* The carrying agency of the mosquito was solved by the self-sacrifice of Americans on the altar of Science. In 1793, Dr. Benjamin RUSH, Professor of Clinical Medicine, University of Pennsylvania, narrowly escaped noting this connection. In a work published by him in 1794, in which he describes the attendant conditions of the great epidemic of yellow fever in Philadelphia in the preceding year, he states: “Moschietos (the usual attendants of a sickly autumn) were uncommonly numerous.”

bearers can be excluded—more especially because, as shown by the work of the Philippine Health Service, considerably greater intervals may elapse during which a persistent carrier may fail to demonstrate. Nor is it only in the gall bladder the vibrio finds a congenial point for assembly of its forces. Greig verified its presence in the urine and in the consolidations of pneumonia, which is occasionally a fatal complication of cholera; its existence in the blood has at times been ascertained, although probably conveyance is by the lymph rather than by the blood cells. On such evidence, he impresses the fact that no longer can attention be confined in cholera to the intestinal contents, but it must be held in mind that a *generalized disease* is dealt with of which the intestinal canal is the point of origin. In discussing the position of agglutins in recognition of the vibrio, he insists upon the necessity of using serum of a high standard of strength, as obtained from rabbits by intravenous injection. As to pseudo vibrios, his experiments brought to him the conclusion that these must be classed as suspicious—more especially during epidemics; a conclusion which, as stated in the *Bulletin*, Vol. 11 No. 1 (Sanitation Number) pp. 12-17 is well supported by the research of the Philippine Health Service.

Greig concludes his paper by remarking that whilst from the time the cholera vibrio quits its host its life is but short, this cannot be said so long as it is resident in man or animals. Consequently, he urges that "The identification of the infected bearers is a measure essential in an intensive campaign against cholera, and that this can commonly be accomplished by the measures taken being founded on the results of carefully conducted scientific research." [Such facts go to show that an essential part of the organization of a Sanitary Service is that the staff of its Central Laboratory should compose complete units capable of field work, and that these should be accompanied by well-fitted mobile laboratories.]

Plague in Ceylon.

Irrespective of the large percentage of the septicæmic form of plague in the total attacks in Colombo and small incidence of rat infection, it has been a matter of interest to ascertain when and how the disease would obtain a foot-hold in other parts of the Island. At page 30 of the Ceylon Blue Book for 1918, it is recorded that there occurred an outbreak of plague at Nawalapitiya (elevation 1,927 feet) in March. The first case occurred on the 28th of that month; its mode of origin was not ascertained. No statement of the subsequent course of the disease or its connection with human cases or rats is afforded. As soon as the disease was recognized officially, "contact" camps were opened and separate accommodation was given to patients. It was however difficult to induce the people to take the matter seriously, and as fresh cases continued to occur and infected rats were found, it was decided to take drastic steps to stamp out the disease. In May, the infected area was evacuated, and 1,864 persons were sent to camp; all clothes were fumigated and surveillance was exercised, whilst the infected area was surrounded with 3,000 yds. of corrugated iron. After thorough cleansing of the enclosed area, the epidemic ceased on June 22nd. In Nawalapitiya, of a total of 126 cases 113 were of the septicæmic type.

In Colombo, during the year there were only 70 cases of plague against an annual average in the period 1914-1917 of 262 cases. This is held not to be due to a diminution of the virulence of the disease; as the case mortality has risen each year and reached its maximum of 96.6 in 1918. Careful enquires failed to show that this was due to concealment of cases and a consequent excess of deaths over attacks being reported. It was found that adult males were "attacked much more frequently than females." Out of 21,000 rats examined only 61 or 0.29 per cent (against 0.30 of the previous year) were found infected.

Rat Destruction

According to the Administration Report of the Public Health Department, Colombo (Dr. Wm. Marshall Philip, M.O.H.), 130,952 rats were trapped or found dead in the City during 1918. He makes the following observations on prevention of plague, including rat destruction:—

"The same preventive measures as hitherto were carried out, reliance being placed chiefly upon the removal and isolation of the patients, segregation of contact, vaccination, closure and improvement of insanitary dwellings, fumigation of rat tunnels by means of the Clayton Sulphur fumigators, pest-mowing of floors and capture and poisoning of rats.

During the year, the indiscriminate setting of poisoned baits was stopped, as it was thought that in the poisoning of rats in occupied houses and the consequent liberation of their fleas there was a probable source of danger to the occupants. It was therefore decided that setting of poisoned baits should be restricted to vacated houses, the rat holes in which are at the same time fumigated and filled up. This method secures not only the destruction of rats, but also of such fleas as may be lurking in the rat tunnels and nests."

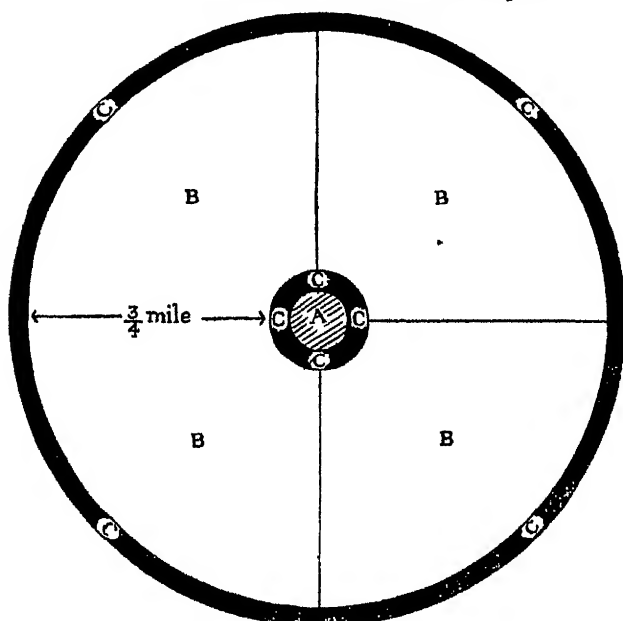
[Dr. Marshall Philip's caution in dealing with rat fleas in individual houses would seem most desirable.

The Japanese are to be credited with the first effort to confine rats to an area within which they are recognized as infected. They accomplished this by sinking corrugated iron $1\frac{1}{2}$ feet into the ground surrounding the houses attacked, and then dealing with the rats and their fleas thus confined. But granting rats would not feel inclined to burrow below the depth thus indicated, and would find climbing corrugated iron an insuperable obstacle, the fact remains that areas containing infected rats may be of much greater proportion than implied in the surrounding of the houses where, by rat or human plague, the first symptom of an outbreak has exhibited itself; whilst it is not everywhere that so large an amount of corrugated iron can be brought together as utilized in Nawalapitiya, Ceylon. But experiments by the writer showed that a very fair substitute for corrugated iron—so difficult of transport—can be secured by employing wire netting; men stationed outside a ring of this netting surrounding houses in which fumigation by a Clayton apparatus is proceeding, are able to kill rats attempting to escape from holes or houses. In this manner, it may be possible to treat a known infected area; but it is evident efforts should also be made synchronously, in the immediately adjacent area, to extirpate rats, lest by chance escapes infection be spread, and *that the scattering of rats and fleas be provided against whilst this extirpation is being attempted.*

Any persistent interference with a rat population sufficiently exact to make a real impression upon their numbers—for example by

poisoning, by the use of traps or fumigation of their burrows—will induce emigration to the next available food providing area. Hence, surrounding a liberally interpreted infected area there should be notified to the public the formation of a much larger circle including the neighbouring inhabited area for, say $\frac{3}{4}$ mile,* which again should

Diagram of Methods of Anti-rat Campaign



- A—Infected area. Escape of rats during fumigation prevented by corrugated sheet iron barriers, or wire netting guarded by inoculated men.
- B—Danger zone. Areas to be alternately baited and trapped and ultimately fumigated.
- CC.—Protective zones. All rat holes, rat “runs” in and near houses and trade stores where rats “most do congregate,” to be protected by acid tar.

be divided into sections which can be treated by organized staffs alternately by bait, trapping, rat hole destruction and fumigation *plus* insistence on the most rigid rubbish and waste food conservancy—conjoined with systematic rat examination for infection. But if it be true that persistent effective interference with a rat population may

* Having regard to the varying conditions of rat life, it is of course impossible to give an exact figure. Irrespective of the impression gathered during several years of plague inspection duty, the writer made a special enquiry in a large town where a plague infected area had existed for a considerable time, and which was surrounded by conditions and dwellings in no way differing from those incident to the infected area. Distances at which dead rats were found from the infected point were noted. It became evident that dead rats declined in number within the human plague area in proportion to the distance from the point infected with both human and rat plague, and were not found $\frac{3}{4}$ mile beyond that point. The distance at least affords a reasonable working hypothesis for the special purpose indicated.

induce their emigration, such efforts might well bring about scattering of rats and incidentally further extension of plague. Consequently, the area beyond the $\frac{3}{4}$ mile circle must be defended from invasion.

The best defensive measure to this end is to notify a third circle the periphery of which should be treated so as to make it repulsive to rats, and thus obtain the nearest approach to a limiting line where no rats are to be found. This can be effected by the use of coarse commercial sulphuric acid and tar (in the proportion of 1 to 9) thrown into the entrance of all rat holes and on their runs, and placed in rings round all places it is particularly desired to protect from their entry. The mixing of the acid and tar should be at the time of deposit—which can be conveniently effected by wooden or cocoanut spoons. The gas evolved into the holes is noxious and the rotting effect of the mixture on the feet and irritating effect on the skin, following persistent attempts to free the skin and feet from adhering particles, renders life in the burrows uninviting.

But rats will get over temporary inconvenience by making use of previously prepared "back entrances" to their burrows or, if these have been maltreated with the tar mixture, will soon make new exits. Hence it is no use attempting this method, unless the person in charge will take the trouble to circumvent the rat by dosing not a rat-hole here and there but will see that all entrances and exits are systematically searched for and dealt with.

It must be remembered that although an occasional death of a rat results from the corrosive nature of the acid mixture, it is essentially not a poison dealing measure but a repellent. Experience and experiment have shown the writer* that a single dosing of all rat-holes with the mixture will prevent the return of rats to their burrows for a minimum of a fortnight and, at times, during many months. Gas coal-tars of the present day undergo such varied chemical treatment before they are placed on the market that at times some forms treated, instead of remaining fluid on addition of the acid, soon become solid and therefore of little utility.

Little room may seem to exist for the alternate use of poisoning, trapping and fumigation in the second circle described (see diagram). It will, however, be found convenient to thus arrange the work of sections of any staff employed to the best advantage, whilst there is avoided that familiarity with methods intended for his destruction which leads to the rat treating them with contempt. The writer has found the Clayton apparatuses or other visible smoke treatment useful in the tracing of rat-hole exits. It will be found that rats in an infected house may have burrows not connected with others in the immediate vicinity but with those on the opposite side of a street, and even at a distance diagonally. It may be added that the tar treatment of rat-holes in an infected house should not be applied till all special treatment for capturing or destroying its inhabiting rats has been carried out. It should then be used to prevent re-entry of rats into the disinfected house.]

*The idea of using acid tar is not original on his part; it was obtained from a Manager of a large sugar factory who had suffered much loss before protecting his buildings by this mode. Recently, the writer has found that BUCKSTONE traces its being advocated in the *Vermin Catcher* of 1768. Here the mixture was "common tar, half an ounce of vitriol, and a good handful of common salt."

Rat Poisons.

The importance of rat killing is beginning to be realized in England, as shown by experiments conducted at the Zoological Gardens, London, by Mr. E. BOULENGER. The experience gained being, in chief part, as useful in the Tropics as in temperate climates the following account of results observed are reproduced from "The Times" (London):—

Giving the conclusions he had arrived at he said that squill poison, the extract of the bulb of the common Mediterranean plant, *Scilla maritima*, which in the small quantities necessary for rat destruction is harmless to domestic animals, gave the most satisfactory results. It is best used by soaking bread in a solution of the poison mixed with milk. Barium carbonate, of which 1½ to 2 grams kill a rat, although 10-15 grams are harmless to a chicken and 100 grams to a dog, is next best. It should be mixed with tallow, and smeared on bread. It can be used effectively with squills. It has the effect of making the rats thirsty, and after it has been put down, bowls with squills and milk should be placed where the rats will go to drink.

Strychnine was not used; it is known to be thoroughly effective, but it is too dangerous for general use. Phosphorous and arsenic, although effective are also very dangerous, and were found in practice less successful than the harmless squills and barium carbonate. Plaster of Paris, magnesium sulphate, and croton were taken, even when thoroughly disguised, only when no other food was available, and therefore were inefficient as raticides. As to virus, there was no doubt that these were sometimes successful, but a large body of evidence showed that their action was extremely unreliable, and that rat populations could acquire toleration of them. The gassing method kills not only adult rats, but the newly born in their nests.

Very many different kinds of traps, some of them of remarkable ingenuity were tested. Some, including those most commonly sold, were useless; others had occasional successes. The most successful type was that known as the "Bratford," a long narrow wire cage, open at each end, but with a central platform with a bait acting on a spring, which closed both doors. The suspicions of the rats were not awakened if apparently there was a clear way.

Scilla maritima has not, so far as the writer is aware, been generally recognized as a rat poison, but as the method which gave Mr. Boulenger the "most satisfactory results," it will doubtless at once gain attention. Barium carbonate has long been employed in the United States and has been regarded favourably. Its use in Burma and the United Provinces (India) has not however shown it to be of any marked utility, according to the Annual Reports for 1918 of the respective Sanitary Commissioners of these Provinces. As regards the lower animals, the warning that doses of the considerable amounts stated are harmless implies that care is taken in the distribution of the poisoned baits, as shown by a recent "accident" to a domestic animal. Such incidents in a campaign against rats dictate the necessity of a strict account being taken of the amount of poison issued for the purpose of making baits, their standard size if of bread, number, exactly where distributed, and how many have been recovered on the morning following deposit. In the Punjab, a satisfactory mixture of fish paste, and a phosphorus compound is made locally under official auspices and is reputed to yield good results. In experiments conducted with various recognized poisons for rats in the Madras Presidency in 1905, it was found that Danysz virus even after careful culture proved untrustworthy, and that the "commonsense rat exterminator" a phosphorus preparation of Canadian origin—gave the most satisfactory effects.

In a preceding Note on "rat destruction," a scheme for employment of poison baiting, trapping and gassing alternately, in different sections of a defined area, is advised. In practice, this is necessary for the securing of continuous results. Otherwise worked, it will be found that an area where either poison or trapping is attempted for several days on end, will give fairly good "bags" of rats for, say, a couple of succeeding nights but that for a further period there is witnessed a general avoidance of both traps and poison. The rat is so wily that he must be put off his guard by not being confronted by a single method to circumvent him - familiarity breeds contempt of the best camouflage. Another apparently equally petty detail is worthy of attention; the rat is believed to avoid bait or traps which he recognizes by scent have been handled by human beings, and thus presumably confirms suspicions as to the object of delectable morsels being recklessly placed so conveniently near his abode; nor is it worth while expecting the rat will yield much to temptation of doubtful foods, when he has at disposal supplies in plenty in storehouses in his proximity which are not rat-proof. In the matter of avoidance of the rat's objection to human handled baits, it is requisite that the bread or bananas used be manipulated by means of knife and fork, instead of direct handling, whilst traps may be made less obnoxious by the attempt to get rid of the human odour by dipping them into boiling water. According to some rat catchers in England, a trace of aniseed as a scent on traps is effective; but of this the writer has no knowledge in practice.

Rats and Cockroaches.

The bug forms an inducement for the cockroach and the latter for rats to enter habitations uninvited. Hence, irrespective of getting rid of material on which the cockroach feeds, it is desirable to get rid of the cockroach on which the rat feeds, in the presence of possible plague.

E. V. WALTER, in the *Journal of Economic Entomology* (1918, Vol. 11, No. 5, p. 428) records experiments as to the efficacy of borax and boric acid, respectively, in killing cockroaches. He found that they were killed by boric acid but not as usually supposed by deliberately eating it as an article of diet, but by their swallowing it as a result of the powder coming in contact with their bodies when the substance is scattered in places they haunt. This is due to their cleanly habits inducing them to get rid with their mouths of adhering dust. He also found equal parts of borax and powdered sugar effective but slower in action than plain boric acid. In this case, the borax also is not deliberately selected by the insect.

Rapid Plague Spread.

The Health Officer, Shanghai Municipal Council (Dr. A. STANLEY) in his Annual Report for 1918, gives reasons for a condition of strained attention to disease prevention. During the year there was ground for fear that cerebro-spinal meningitis, which had assumed epidemic proportions in Hongkong, might extend its ravages; it was however confined to a few cases in Shanghai. Influenza, as elsewhere, gained a foothold and exhibited two waves; but "Shanghai escaped lightly

considering the excessive overcrowding." But it was towards the North of China that he looked with special anxiety. The Shansi epidemic of pneumonic plague—the first evidence of which was in Nov. 1917—by March 8th, 1918, had spread as far as Nanking, and in the course of its progress, had claimed 15,000 victims. It was found that the 'carriers' of the plague in the Manchurian epidemic were those engaged in the fur and wool trade as in the Shansi epidemic." The railways were great aids to spread, notwithstanding special measures taken by the Authorities concerned. Dr. Stanley thus narrates the attending circumstances:—

"But some remarkable long distance sprints succeeded in bringing infection down the Tientsin-Pukow line to Fengyang (Anhwei) on Feb. 5, Tientsin on Feb. 11 and Nanking on March 8. This seriously endangered the populous and overcrowded centres in the lower part of Yangtze valley. By this time, however, the return of spring-like weather helped to prevent further spread. These long distance infections serve to show the enormous potentialities of spread once the railways are reached by persons incubating plague."

Fortunately no case of pneumonic plague occurred in Shanghai. So far as ordinary plague conditions are concerned, the Health Officer considers that the Building Laws "requiring solid ground floors, absence of hollow ceilings below the first floor and no hollow lath and plaster partitions, have enabled a considerable reduction in expenditure to be made in measures taken against plague." No infected plague rats were found during the year in Shanghai.

INFLUENZA.

Its Epidemiology.

Surgeon W. H. Frost opens a paper in the *U.S. Public Health Reports* of August 15th, 1919, with the following remarks:

"The history of influenza, so far as it is known, that is, for several centuries, comprises a series of long cycles in which pandemics alternate with periods of relative quiescence, the length of cycles as measured by the intervals between pandemics being usually a matter of decades. The special characteristics of influenza pandemics are their wide and rapid extension, their high attack rates, and their great effects upon general mortality rates."

In absence of specific records, he considers much information can be gained by at least tracing the history of one complete cycle; and, for this purpose, he selects the period from 1889 up to the present time. He produces statistics showing that American experience coincides with that recorded by PARSONS and FRANKLIN in their Reports to the Local Government Board, England, on influenza, extending from 1889-90, 1891 and 1891-92, in that epidemics developed in three distinct phases.

The American records show that the first phase culminated in January 1890, the second in 1891 and the third in 1892; the mortality in 1891 was higher than in 1890 and still higher in 1892, whilst in 1893, though no distinct epidemic existed, pneumonia mortality was higher than in 1892.

In Europe, in April and May 1918, mild epidemics were reported in various localities; in June and July, there were extensive epidemics in Great Britain, various parts of Continental Europe, China, India,

Philippine Islands, and Brazil. His study of the statistics has led him to hold that in British cities, the disease "has so far manifested three distinct waves—the first and slightest in point of mortality occurring in June and July, the second and most severe in November, the third in February and March" In cities in India the sequence was similar but the mortality far greater. In the United States, the epidemic developed more largely in a single wave during September, October and November.

In an analysis of statistics (*Pub Health Reports*, June 20, 1919) received from various countries up to April, 1919, the same author in conjunction with Edgar SYDENSTRICKER, Statistician, U.S. Public Health Service, is able to show that in countries widely apart, the three wave theory was applicable and, in certain of them, the highest mortality rate was chronologically simultaneous. A table is produced showing that in 1918 this was reached on Oct. 5 by Bombay and two cities in the United States, followed by three cities in the latter country on Oct. 12; on Oct. 19, it was reached by ten cities in the United States, two in Great Britain, four in Continental Europe, and Madras; on Oct. 26, by 20 cities in the United States and four in Continental Europe; Nov. 2, by seven cities in the United States, three in Great Britain, and three in Continental Europe; on Nov. 30, it was reached by three cities in Great Britain and Calcutta.

Its Chronology.

The history of the epidemic in Colombo has interesting features, as related by the Health Officer of the Municipality (Dr. Wm. C. Marshall PHILLIP). He shows that influenza made its appearance in Colombo in May, became epidemic in June and throughout July, but by the beginning of August had "practically ceased." In this period, the prevalence was so great that at one time a "serious dislocation of business" was threatened. "The chief symptoms were sudden onset with fever, headache, pains in the back and limbs, sore throat and some bronchial catarrh, this latter symptom being rather a striking feature of the outbreak. Here, as in other places, there was considerable doubt as to the specific nature of the disease. The illness generally lasted from 3 to 5 days, and very early began to be referred to as "three day fever." It seldom ended fatally. "The disease practically vanished at the end of six weeks, but, by the third week in September, "a large number of cases were complicated with a very virulent and rapidly fatal form of pneumonia which, in ten weeks, was responsible for raising the annual death-rate from pneumonia from 21 per cent. below the mean, at which it stood in 1917, to 80 per cent. above the mean." Unfortunately, influenza in Colombo was not a notifiable disease, "but some idea of its extraordinary prevalence may be gathered from the fact that, during October and November, 9,200 cases including 961 of Pneumonia were treated by the Municipal staff alone, the proportion of the pneumonia cases being 10½ per cent." It will thus be seen that Colombo may be added to the list of cities so widely scattered throughout the world, in which the peak of the mortality wave was reached between October and November of 1918.

Fears founded upon the chronology of the epidemic of 1918 in India are again experienced in that country; in July of the present year

the disease became once more evident in Bombay, Calcutta, Madras and Rangoon. In Rangoon, on July 11th, Municipal statistics showed that of 377 deaths during the week 92 were due to influenza, and 41 to respiratory diseases.

Influenza Types.

In the Annual Medical and Sanitary Report, Seychelles, for 1918, Dr. J. H. BRADLEY, Asst. Medical Officer, South Mahe, makes the following observation as to influenza, as observed in his area :—

“ In the last quarter of the year, the disease appeared in the districts; its advent was mild; but, as time goes on, it appears to gain force and virulence. A good many of the patients, especially children, appear to have a gastro-intestinal form accompanied by vomiting, diarrhoea and chalk coloured motions. At times the disease is accompanied by a form of rash, and in all cases there is fever and generally cough. Lately, some cases have developed a pneumonic form of the disease.”

LEPROSY.

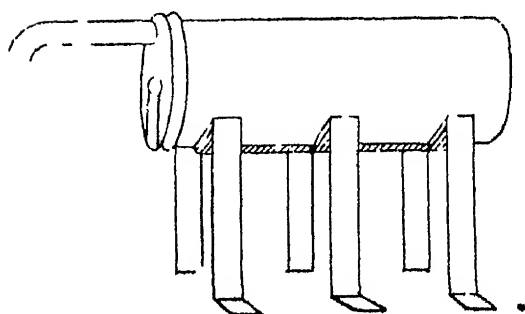
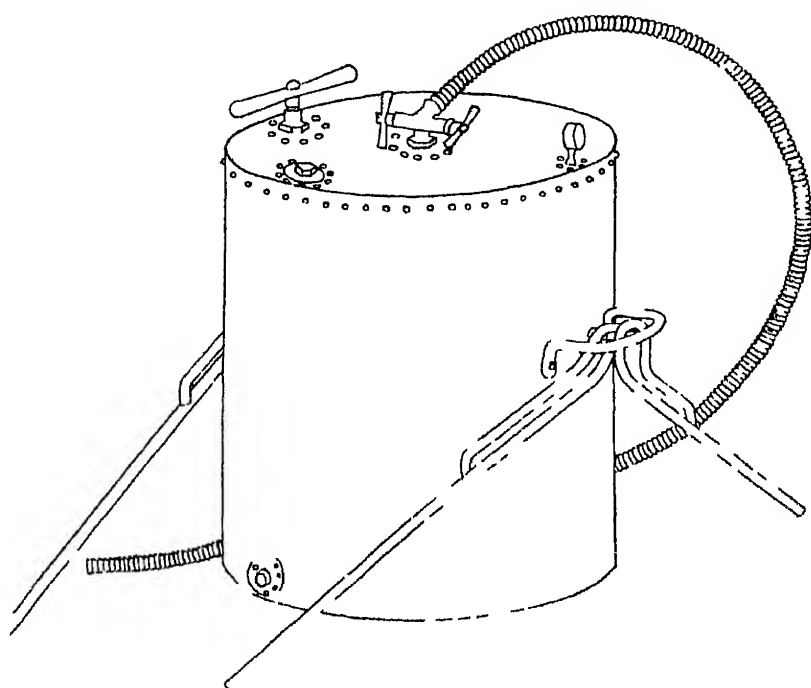
According to the India Census of 1911, in each 100,000 of a population of 315,132,537, there are 51 males and 18 females who are lepers. An Act giving power of segregation* and providing for the care of these unfortunates was provided subsequent to the Report of the Indian Leprosy Commission of 1891—but for various reasons, chiefly financial, little progress has been made in giving effect to its powers. The Census Commissioner in respect of the figures quoted, called attention to the remarkable difference between the incidence of the disease amongst males as compared with the opposite sex, and, whilst aware that concealment might be better practised by females, considers there is some evidence to show its greater incidence is with the male sex. The proportion of lepers under ten years of age† is very small. He states :—

“ There is a considerable increase between 10 and 20; from that age up to 50 the rise is uniform and fairly rapid. Between 50 and 60 the proportion continues to increase slightly, and then declines. Bearing in mind the fact that a leper's life is a short one, it would seem that the greatest liability to the disease occurs between 20 and 50.”

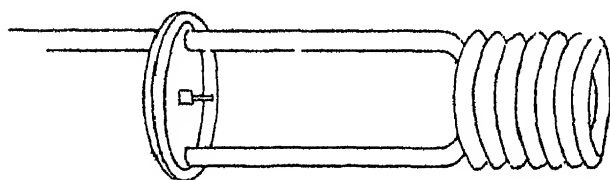
In an address given at a Meeting advocating the cause of lepers in India, Lady CHELMSFORD stated that it is computed that at the present time there are between 100,000 and 150,000 lepers in India, and that only 7,000 of these are cared for in special Institutions. The Rev. F. OLDRIEVE, Secretary of the Mission to Lepers in India, at a Meeting held at Dacca on the 23rd July (Associated Press) referring presumably to the necessity for segregation stated, “ Without proper care the disease was likely to spread and, by way of illustration, referred to a certain village in which there were now to be seen 65 lepers in place of only one 30 years ago.”

* The necessity for this was urged by CARTER (Bombay) of relapsing fever fame.

† As affording support to the opinion that leprosy is not hereditary, it may be stated that in 1913 (“ Statesman ”—Calcutta, 16.11.1913) the Leper Asylums under the Mission to Lepers contained 500 children of lepers who were free of the disease.



Case for oil jet with stand.



Oil jet

THE "LOCAL COMET HEATER," AN APPARATUS ADAPTED FOR
FLAME STERILIZATION

ANKYLOSTOMIASIS.

Prophylaxis.

Imperfect discipline and the absence of appreciation of the necessity for care in respect to night soil deposit are adverse factors to be contended with in ankylostoma prophylaxis. Granted public latrines are provided for the poorer classes, the outside may be regarded with more favour than the interior, and soil defiled with faecal matter and accompanying ankylostoma ova in the immediate surroundings may well result. That this may remain an important factor in spread, notwithstanding the provision of latrines, is shown by the following quotation from the Ceylon Blue Book for 1918, p. 32 :—" Experience shows that re-infection occurs due to soil pollution; hence conjoined with erection of privies, 19,000 of which were erected, a campaign must start from central points and work outwards." Whilst the attacking of such defiled areas is necessary on behalf of the bare-footed citizen, no generally adopted method is at present in force. Meanwhile, Dr. Angus MacDONALD (M. O. H. Jamaica) has advocated the employment of salt in latrine pans. The California State Board of Health, Special Bulletin, No 28 of 1918, thus refers to this method —

" In spite of rules and precautions stools will sometimes be deposited in mines. It has been found by experiments conducted by the Biological Division of the California State Board of Health, that common salt in sufficient quantity will kill the developing hookworm larvae. We advise therefore that whenever a stool is found in a mine that it be taken up and thrown into the toilet and that the earth where it was deposited be sprinkled thickly with several pounds of salt. This will kill the hookworm larvae and prevent the spread of the infection."

HALDANE, in his Report of 1903, as to the Westphalian Colleries (p. 10) speaks of "common salt in a very strong solution as fairly effective; but the ova will hatch in salt solution up to 2 per cent." In regard to antiseptics he states, "the newly hatched larvae are far more sensitive to antiseptics than the ova or encapsulated larvae; and even 0.2 per cent. of phenol will kill them." He describes the use of milk of lime also "as fairly effective." The burning of grass over a defiled area is one of the measures recommended, and if the heat thus produced on soil were sufficiently prolonged the result should be beneficial; but the writer believes it is unlikely that a protecting layer of vapour would not intervene, in the short action feasible by this mode. There is room therefore for an experimental investigation on this simple yet widely important subject; as the experience of Ceylon has been found also applicable to tea gardens in the north of India, whether privies provided be on the pan or on the cesspit method, which latter is frequently advised as a safe mode of disposal of ankylostomes.

[For the treatment of large contaminated surfaces, the intense heat capable of being placed at disposal by petroleum, gasified and under pressure, when passed over surfaces by means of long flexible tubes attached to the "Lucal Heater" (see figs.) or "Wells' Heater," or, for small areas (if plenty of time be at disposal) the "Petrolia" (largest size made) brazing lamp, is well worthy of experimental trial in this connection. Experiments conducted by the writer as to the disinfection of earthen floors in 1899, and kindly repeated with full laboratory facilities by Major CHRISTOPHERS, C.I.E., I.M.S., in 1905,

furnish, both as to surface results and depth of heating effect, data which point to the possibility of this simple mode being of utility.]

Ankylostomiasis in Mines.

That in the absence of rigidly conducted night-soil conservancy in Mines ankylostomiasis is particularly favoured, has long been recognized. HALDANE, in his Reports of 1902 and 1903, concerning this disease in Cornish Mines and Westphalian Collieries declared that "three conditions are necessary—(1) pollution of the ground by human faeces containing anchylostoma ova, (2) a certain range of temperature in the mines and (3) moisture of the ground." So much attention has been given of late years, to the existence of this disease among orientals, and their frequently bare-footed mode of progression, that it is apt to be forgotten that ground itch may be acquired elsewhere than on the feet. For example, the Cornish miners do not work bare-footed and penetration presumably occurs elsewhere.

In California, the recent Army recruiting and the work of STILES and the Rockefeller Institute have attracted attention to the fact that ankylostomiasis is prevalent amongst the miners of that State. Hence special action has been taken by the California State Board of Health on this subject, in combination with various Industrial authorities. The aid of the Consulting Biologist of the Board of Health, Prof. Charles A. Korman, has been called upon and he has, in Special Bulletin No. 28 of the California State Board of Health, published his conclusions. These deal chiefly with the defects of night-soil collection and disposal as ascertained by him on local inspection, and, presumably in reference to possible skin contamination, he has advised certain forms of latrines which favour the *a la Turque* position. As to pails, he considers their cleanliness could be facilitated by the employment of a "paraffined bag inside the can to receive the deposit."

The following rulings are in force.—

"It shall be the duty of the operator of every mine, for the purpose of improving the sanitation thereof and preserving the health of those employed therein, to provide an ample number of dry or water-closets upon all main working levels for the use of all men employed in the mine. Ready means of access to each closet shall be provided by the operator. No such closet shall be constructed without adequate provision for the effectual cleansing and removing of the contents thereof, which shall be removed and disposed of often enough to prevent it becoming offensive. It shall be the duty of the mine foreman to cause each closet to be supplied with some disinfectant or deodorizer to be sprinkled upon the contents thereof. It shall be the duty of all men employed within any mine where such closets are provided to use such closets exclusively when in the mine, and the neglect or failure of any man employed in a mine to use such closets when provided shall constitute a violation of these rules; *provided, however*, that this section shall not apply to any mine where the operator or superintendent prefers to permit the men to go to the surface, and requires the men to do so."

SMALL POX.

Infantile Vaccination.

The following extract from the Report on Vaccination for the year 1918-19 by the Sanitary Commissioner, Burma, in his capacity of Superintendent-General of Vaccination in that Province, emphasizes

(the necessity for infantile vaccination being conducted so as to reach fully the population of the ages concerned :—

" Successful primary operations at under one year totalled 120,613 in a population of over twelve millions, a little over one per cent., whereas the child population at the close of the first year is estimated at 3.6 per cent. of the total population or about 441,000. At ages one to six years, 218,165 successful primary operations were performed, and divided evenly over the five years period this would mean the protection by vaccination each year of 43,633 of the survivors not protected in their first year. The mortality is however heavy at each year of this period, about 10 per cent. dying in the second year of life, 6 per cent. in the third, 5 per cent. in the fourth and rather under 3.5 per cent. in the sixth, while over 23 per cent. of the survivors of the first year die before they have completed the sixth year. Hence we have a population of from 100,000 to 150,000 passing unprotected into the age-period above six years, in which only 58,942 were vaccinated in 1918-19. The results of the activities of the Vaccination Department are, if the returns can be depended upon, encouraging, but there is still a large child population at all ages which remains unprotected. Efforts are being directed at reducing the age at vaccination to as low a figure as possible."

[In the small-pox epidemic which followed the war of 1870 France suffered heavily, according to VACHER, the deaths from small-pox were not less than 89,951 and in a further estimate he considered 200,000 deaths were probable (PRINZING). During the late war in knowledge of possibilities thus gained, vaccinations were pushed by the French energetically throughout the Army and the civil population. In Paris, 1,374,000 operations were performed—of which 306,587 were due to the timely order by the State Health Service to require revaccination of employees in factories working on behalf of Government for the national defence. As to the general population of the City, every effort was made to induce individuals to undergo vaccination or revaccination, whatever their age, if a period of five years had elapsed since last subjected to one or the other. As a result of these timely efforts, in Paris, which in the 1870-71 period had suffered 15,000 deaths from small-pox (*L. CAMUS*), there were registered only 56 cases of small-pox with 24 deaths, from August 1914 to 1st. Jan. 1919. The cases occurred chiefly amongst strangers entering the City (*G. UILHARD*). These facts illustrate further the importance, as represented by Lt.-Col. WILLIAMS, Sanitary Commissioner for Burma, of complete as against incomplete vaccination of populations.]

Vaccine Preservation.

The Health Officer Shanghai (*Dr. STANLEY*) in his Annual Report for 1918, makes the following remarks as to the influence of temperature upon the duration of activity of glycerinized vaccine :—

" Those who have occasion to use smallpox vaccine during the warm weather should remember its great sensitiveness to even a moderately elevated temperature. It may be noted that vaccine at a temperature of 57° C. becomes inert in five minutes. Even at 37° C. a temperature often reached in summer in China, vaccine is rendered inert in 24 hours. On the other hand, at 5° C. below zero vaccine will remain unaltered for a year. Unless therefore there is some special reason, vaccination during the warm

* *Bull. Office Internat. d'Hygiene Publique.* 1919, June, pp. 611-612.

weather, say, between May 1 and September 30, is inadvisable in China owing to rapid loss of effectivity at the prevailing atmospheric temperature."

[Irrespective of temperature, it is essential in undertaking preservation of vaccine that it be ascertained that the medium employed is itself in a suitable condition; thus glycerine may be found in the market possessed of undesirable free oleic acid, whilst lanoline, which should be anhydrous, neutral and free of glycerine fats, may not only not answer to this description but may contain free chlorine. Neither medium should be employed without the guarantee of the brand being that of a reputable firm and undergoing local chemical test.]

MM. R. WURTZ and L. CAMUS have written a paper which appears in the *Bulletin de l'Académie de Médecine* of the 1st July, on the subject of vaccine preservation. After remarking on the difficulties of preservation of activity of vaccine in warm climates, they hold that desiccated vaccines present advantages, but that hitherto when sent to distant parts very variable results have been secured, so that, in the hands of military officers, this form of vaccine has been completely discredited. In 1910, the subject was specially studied by the authors, and they consider they have produced a desiccated vaccine which has proved useful in certain of the French Colonies. In their preparation they, in the first place, make sure that the original call pulp is of good activity. Thus they report that, in the fresh state, the pulp used by them afforded "numerous vesicles" in a dilution of 1 in 20,000 in a dose of 0.3 cc.

Their technique requires that the pulp be first frozen and then allowed to return to some extent to its natural state. It is thus capable of being readily dehydrated without damaging the virus which "so to speak passes from a state of activity to a state of sleep." The pulp is then rendered free from foreign matter on a sieve, is again frozen, and is placed under an air-pump in the presence of sulphuric acid or, better, phosphoric acid. The authors insist that this manipulation shall be conducted as rapidly as possible and, for this purpose, employ a short-stroke pump actuated by electricity. In placing the desiccated vaccine subsequently into sealed ampoules, they conduct manipulation in a dry atmosphere in the presence of sulphuric acid, or better, phosphoric acid, within a receptacle so arranged as to give the necessary shelter, and yet permit of the operator breathing in the open air. They report that certain specimens of desiccated vaccine thus prepared have withstood a temperature of 37° C. for several weeks. Nevertheless, they consider it goes without saying that degeneration must be expected under the influence of age and attenuation due to climatic influences, and therefore it cannot be hoped that activity can be retained indefinitely. Hence they warn that advantage should always be taken of ice chests for storage and, in ships, of utilizing the usual refrigerating chamber, and that the same precaution should be observed at centres of distribution. They also require it be regarded as of the highest importance that the ampoules should not be opened till the moment for operation, and that besides the precaution that really clean mortars are used for grinding and mixing the vaccine, the glycerine and water to be utilized should be very cold.

[Unfortunately, the paper gives no figures contrasting results with desiccated vaccine otherwise prepared.]

The Protection of Vaccine.

According to the *Annales d'Hygiène et de Médecine Coloniales* (1914, Vol. 17, No. 3, pp. 871-885) vaccine is supplied in Tonkin by the local Vaccine Institute to officers of the Vaccination Dept., on their making the demand by telegram. The transmission of the vaccine is then facilitated by the chief officers in charge of the area concerned.

The vaccine is despatched in glass tubes placed within sections of bamboo. Each vaccine tube is blocked at the two ends by means of a plug of cotton sterilized and paraffined. These tubes contain sufficient vaccine for from 200 to 500 persons. In dealing with this large quantity, instead of displacing the vaccine by "expellers" or direct blowing, a twig is used for pushing one plug through the length of the tube whilst that from the other has been removed. The vaccination work is conducted during the cold season and the temperature at that period is not sufficient to sterilize the vaccine but, as a precautionary measure, the vaccine tubes are kept within a piece of banana-tree stem placed within a section of bamboo.

PASTEURISM.

In the Annual Report of the Health Officer, Dr. STANLEY, Shanghai Municipal Council, for 1918, p. 22, it is suggested that it is not desirable to retain dogs in this area, as "there is always a reservoir of rabies infection on the borders of the Settlement from which Shanghai dogs may be infected." As a preventive measure, Dr. Stanley believes in increasing the licence fee to five dollars. In India, the reservoir of infection is generally regarded as existing in jackals, which communicate rabies to pariah dogs. As a preventive measure, however, it is usual to kill pariah dogs annually, instead of facing the difficulties of dealing with jackals. According to an abstract of the Report of the Shillong Pasteur Institute by the "Madras Mail," the "jackal bite as compared with dog-bite is much more fatal and the treatment probably has less chance. Children, as compared with adults, seem much more susceptible to infection with the virus of rabies but respond more readily to treatment. The worst class of all is the young child severely mauled by a mad jackal. Unfortunately, such cases are far from rare at Shillong."

In Shanghai, since 1899, 662 persons have passed under treatment; excluding instances where hydrophobia occurred within 15 days after completion of the treatment, the mortality amounted to 1.2 per cent. In Shillong, during 1918, 90 Europeans (including seven Anglo-Indians) and 978 Indians underwent treatment. Excluding those dying within the fifteen days period, the death rate was 0.56. The following is a summary of the Report by Lt.-Col. J. W. CORNWALL of the Pasteur Institute of Southern India (Coonoor) for 1918-19, as also given by the paper above quoted:—

In his report on the working of the Pasteur Institute of Southern India, Colonel J. W. Cornwall states: "The increase in the number of patients proved somewhat less this year than was anticipated. It is probable that influenza and the difficulties of railway travelling, particularly on the Nilgiri railway, were factors of moment in deterring many who would otherwise have come. Owing to the shortage in labour and materials it has proved impracticable to put up new buildings urgently needed for the accommodation of indigent patients. Over 2,975 persons went through

the full course of treatment, an increase of 579, the increase entirely being among Asiatics, and Europeans were 112 fewer than in the previous year. Four patients died during the course of treatment from hydrophobia, one from cholera and one from small-pox. Four died in less than fifteen days from the date of completion of treatment, and 22 died fifteen or more days after completion of treatment. The percentage of deaths from hydrophobia of those treated is 3.37 and the percentage of deaths of those untreated 6.05. The percentage of failures is .74. The total number of persons treated from 1907 to 1919 is 15,265. Most of the cases treated last year were in February, July, August and September. The results of the special enquiry which has been in progress during the past six years, but which has no bearing on the efficiency of treatment, show that of 215 persons bitten 74 were treated, and deaths among the treated were *nil* and among 171 untreated there were 81 deaths.

TOWN PLANNING.

To secure advance on the lines of least resistance is a requirement of sanitation as well as of politics, in certain tropical areas. It is however by no means necessary to accept without careful sifting all objections to sanitary advance which may be pleaded by interested or conservative persons. The busy Sanitary Officer will not find time lost in pursuit of knowledge in this direction; he may at times be beset with claims made for rejection of schemes in the name of religion, caste or custom, which may be wilfully exaggerated, or are due to terminological inexactitude, or, it may frequently occur, are honestly entertained without sound reason. In all cases, time spent in unbiassed and judicious enquiry is rarely wasted; because sanitary methods being no rule-of-thumb matter, it will often happen that the sanitarian is able to modify his suggestions, or adopt equally efficient methods which are not offensive to indigenous susceptibilities, and thus meet just prejudices. Town-planning is happily one of the subjects which has engaged the attention of the present Government of Sierra Leone.

The following extracts from the Annual Report of the Medical Dept. for 1917 show that Dr. R. LAURIE, the Senior Sanitary Officer, believes it possible to secure sanitary ends and yet take due cognition of native prejudices:—

"Leprosy while not uncommon in this country, is a disease which could be brought under reasonable control by getting the chiefs and people interested in what seems to me to be the simplest means of preventing its transmission to other members of the community, namely, by making the chiefs and headmen responsible to report to the District Commissioners the appearance of all cases of the disease in their towns (they can all recognise it) and by compelling them to provide, a short distance outside the town, proper accommodation for the patients, and the requisite amount of food and clothing. In fact all the lepers belonging to one tribe might be collected into one area, the tribe as a whole, or the villages to which the patients belong, providing for their housing and subsistence, which would not cost a very great amount of money, and this latter plan would be more congenial to the sick and produce better results than the isolation of patients outside villages, as, in time, they might become little self-supporting colonies, and anyone, with the least experience of West Africa knows that tribal distinctions would have to be made if the patients would be happy and try to live their lives according to their custom.

* * * * *

"In some of the out-stations the clearing around towns and villages was extended, and where an extension of a village took place the huts were built farther apart than usual, thus necessitating the opening up and keeping clear of a greater area of ground. A large number of villages are

closely surrounded by bush, but an attempt has been made, which has resulted in some success, to get natives to build on more open sites, as much of the bush in the neighbourhood of villages is regarded as sacred, and there is some opposition to any suggestion of its being cut down or interfered with in any way. This sacred bush is generally a most unsanitary area and a fertile source of mosquito-breeding."

* * * * * *

' In town-planning, as in everything else, the mode of the life of the inhabitants has to be considered and to some extent followed, and as the more important tribes, such as the Mondis and Tennes, live on the family system, and their huts, as originally built are of a more or less uniform size, though standing at varying distances apart, some being very close together and dotted irregularly over the site area, groups of huts being fenced in or connected up by low mud walls, it became necessary to construct a plan giving them the advantages originally sought and providing sufficient space for necessary sanitary accommodation which, except in the compound of the Chief, was usually wanting."

In this *Bulletin* Vol 11, No. 1 (Sanitation Number, July 15th 1919), the astuteness with which legal rulings can be dealt with by Indian immigrants is adverted to. To this it is well to add the recognition of an item which is rarely acknowledged "in the limelight," but, nevertheless, is a very solid fact which should be taken into account in the course of town planning—involving movement of an Indian population of a prosperous class. All sorts of legal and financial obstacles may be duly surmounted by the originator of a scheme, and evacuation of an area would seem a matter of course but from some incomprehensible reason no movement takes place—at any rate by the more influential members of the community. A European vacating a dwelling in which he and his forefathers may have long dwelt may do so with regret that may savour of sentiment, and, when asked his reasons, will probably define them as due to mental "associations"; but with a certain class of Indian such associations are tinged with the belief that the prosperity which has favoured his career in the old home may not accompany him in his new residence; and he has a big task before him to conquer this haunting fear. Conventionalities or ambition may cause him to live in a palace—but, if he has his heart's desire, the old house would remain and form his favourite retreat from world worry.

This difficulty, at the usual late stage of town planning, has been found to be a factor of importance to be reckoned with by the Improvement Trust of Calcutta, as shown by the following extract from a leading Article in the "Statesman" (Calcutta) of August 29, 1919:—

"On the other hand the space now occupied by the mint would be of the greatest utility in facilitating the improvement of Burrabazar, --the centre of Indian trade in Calcutta, --the remodelling of which might be regarded as the very kernel of the huge task which the Improvement Trust is steadily and successfully pursuing. The Trust's letter touches upon one point which seems to be really irrelevant. [Not so: it may be camouflaged but is probably the kernel.—W. G. K.] It may be suggested as the letter observes, that if this closely built business area in Burrabazar is surrounded by residential areas the additional profit derived from using the land for commercial purposes will in the natural course of events lead to the speedy conversion of residential property to trade purposes; but it is pointed out that in the special circumstances of Calcutta this is a change which takes place with extreme slowness. Speaking generally, says the letter, the prospect of making a money profit will not induce the Bengali to part with his ancestral residence; and thus the population of Calcutta is 'immobile

to a degree which does not exist elsewhere' Whether the reluctance of house owners to move arises from sentiment or from a shrewd appreciation of the value of money, or from both motives together, the immobility of the population remains as a fact to be reckoned with."

RACE CUSTOMS AND HYGIENE.

In the previous Note the necessity for study of race prejudices and customs by the sanitarian (if, as always must be the case, mutual good understanding is aimed at with the various peoples dealt with in the tropics) has been referred to. Having regard to the large number of Indians in our Colonies, the following advertence by the "*Madras Mail*" to a custom connected with wells may be of utility:—

'In a recently published Manual of District Board Work dealing with Water Supply, Mr. L. C. Sen-Gupta, B.E., District Engineer, Berhampore, is obliged, for practical purposes, to consider the prevalent customs of the people with whom the District Boards have to deal. He notes the following curious one: 'Amongst the Hindus,' he writes, 'the prevalent custom is that a well in which a cow cannot turn round and round cannot be used by both the Hindus and the Mahomedan—that is, if a Mahomedan once touches such a well, the water of it is spoiled and no Hindu with religious scruples will use its water any more. In many districts where the population consists of both Hindus and Mahomedans the wells are for this reason made of six-foot diameter, it being taken for granted that a cow can turn round in a six-foot diameter well. Even in purely Hindu villages Mr. Sen-Gupta thinks it better to construct the well of six-foot diameter because 'if the well is touched even accidentally by a Mahomedan traveller, the Hindus will never again use the well until it is purified by some religious ceremony.'"

A custom worth remembering in handing over a newly constructed well—replete in sanitary expedients—to certain Hindus is that they may not abandon an obviously foul source of supply it may be intended to super-eede, until the new structure placed at their disposal has undergone purification by certain ceremonies, which may include the slaughter of an animal, say, a goat. Another custom in connection with water-supplies periodically forces itself upon attention. The Ganges, as a sacred stream, offers a medium for disposal of corpses which forms an alternative to cremation and disposal of ashes therein, more especially practised when fuel is costly. During the recent influenza epidemic, the consignment of corpses without cremation to that river attained considerable dimensions, as shown by the following extract from the Annual Report for 1918 of the Sanitary Commissioner for the United Provinces, India (Col. MACTAGGART, C.I.E. I.M.S.). His remarks upon the public water-supplies thus contaminated as delivered after filtration are of interest, and lend support in practice to the deductions by Major CLEMESHA, I.M.S. in regard to the rapidity of change in bacterial constitution of river waters in the tropics, as exemplified in India:—

"During the recent epidemic enormous numbers of bodies were thrown into the river, and as the volume of water in the rivers was abnormally low, masses of bodies accumulated at certain places in the river beds. The disposal of these bodies was a matter of the utmost difficulty, but eventually the rivers were cleared of corpses. The most effective way of dealing with the difficulty was found to be the stretching of nets or the placing of fences at intervals across the river beds, boats manned by Doms being stationed at those obstructions to remove the bodies as they floated down and burn or bury them. In municipal areas every possible effort was made to prevent bodies being thrown into the rivers and free fuel was

giving for burning corpses, but it is obviously impossible to patrol effectively the thousands of miles of river bank in the Provinces, and in the recent epidemic it was found practically impossible to prevent the people from throwing bodies into the rivers. So far as we know no particular harm resulted to the community from the accumulation of dead bodies in the rivers. Filtration at water-works in the large towns was thoroughly effective and bacterial counts from every filter, made regularly once a week, showed that the purity of water supply was absolutely maintained. It is difficult to see what can be done in any future epidemic to prevent bodies being thrown into the rivers. Legislation making it a criminal offence punishable by a court would be strongly opposed by the Hindu community, and even if passed it could never be made effective. So far as I can see no useful action can be taken beyond noting what has occurred in the present epidemic and urging on district and municipal authorities the necessity for taking, in future epidemics, early steps to erect barriers at intervals across the rivers, such as have been found effective in the present epidemic, and to provide free fuel so as, if possible, to induce the people to burn their dead rather than throw them into the rivers."

DISEASE FOCI.

The Principal Medical Officer (Dr. A. D. MILNE, C.M.G.), East Africa Protectorate, in his Report for 1917, ends the Section "General Remarks" with the following summary —

"The general tenour of the reports from almost all Districts was that, on the whole, the public health of the country was unexpectedly good. Returned carriers were sent back in much better condition than last year. Whilst there was no great variation in the class or character of the diseases treated, there were the usual manifestations of communicable diseases spread over the country. Malaria as usual was rife everywhere; and but few districts escaped dysentery and the occurrence of sporadic cases of small-pox; Cerebro spinal meningitis appeared at such widely separated centres as the Nandi country, Machakos, Nairobi (where it assumed considerable dimensions), Mombasa and the Tana River. Plague made its appearance on the Kisi and Maragoli hills of Kavirondo, Kyambu, Nakuru and Mombasa. The desert areas suffered notably from beri-beri. A small epidemic of influenza was reported from Meru."

Referring to the heavy strain the recent war placed upon the Medical and Sanitary Staff of the Protectorate, the Principal Medical Officer states that in the case of those who remained on civil duty during the war, "there was a strenuous lot—complying with depleted staffs with the War Office Regulations, and at the same time fulfilling their obligations to the Local Government." All leave except on medical certificate was necessarily stopped—so that continuous service of several years standing was "beginning to affect the physical energy and mental outlook of the men." As far as possible reliefs were sent from England

but they were necessarily inadequate. [Having these facts in mind the Principal Medical Officer was doubtless justified in regarding the health conditions of the country as "unexpectedly good"—but it is obvious that in East Africa the war has left an aftermath, which, having regard to the nature of the diseases indicated by him and their position in relation to trade routes, possesses serious potentialities, and will demand much forethought and effort at the hands of local authorities if timely inhibition is to be accomplished. In this respect, East Africa will well merit attention, for some time to come, by those interested in epidemiology; p. 25, of the Report quoted shows "these dangers have been fully realized by the Administration"; eight new Medical Officers and staff are provided for in the 1918-1919 estimates].

PRICKLY PEAR.

In an age when light in action with selenium may be a medium of conveyance of printed literature to the blind and the human voice may be carried by "wireless" many miles, the secret of how to conquer the prickly pear pest which would mitigate insupportable conditions in hundreds of villages in India and, in Australia, release for agriculture huge areas of land remains yet to be discovered. The subject is one which is well worthy of the investigation of not one but of several branches of science.

To render the plant of commercial use would, of course, be a desirable way of bringing it under conditions where its growth would be subject to selection and restraint. The most obvious method of utilization for this purpose would be its employment for the propagation of the cochineal insect. In early days the Spaniards considered the trade of sufficient importance to require the exercise of a monopoly guarded by extreme penalties. In Tenerife, the encouragement of the growth of prickly pear on behalf of cochineal lingered up to recent years, in spite of the introduction of aniline dyes.

Amongst other tropical areas the cochineal insect was introduced into India, and it is on record that in some localities the prickly pear was destroyed by their agency. This fact is at intervals stumbled upon by those anxious to get rid of the prickly pear pest. The writer, in 1896, initiated an official enquiry as to this possibility, only to find that it was a well-worn subject, which is liable to be taken up from time to time and abandoned without there being obtained any definite verdict. As a result of expert opinion then evoked, it was elicited that various insects were credited with more or less destructive power on the plant; but, so far as limited experiments in connection with this enquiry went, whilst the exposed parts of the plant were duly killed the roots remained invincible. As to the cochineal insect, the habits of the variety recognised by commerce and the "wild cochineal" were reported to differ; and it would seem open to doubt which of the two varieties has a preference for the red-flowered *opuntia* and which for the yellow-flowered—a fastidiousness with which they seem credited. One authority (H. A. STUART) recalled an interesting statement on the subject in WILKS'S History of Mysore. Speaking of Tippu's repulse at Satayamangalam in 1790, Wilks says that "the Sultan ascribing this disappointment chiefly to the enclosures we have mentioned, he some years afterwards ordered them to be entirely levelled over the whole face of the District; and it is a curious fact that he was materially aided in this operation by an almost invisible agent. The prickly pear or 'straight thorned opuntia' is the chief material of these fences, and the Silvester cochineal insect introduced into Coramandel shortly after the order had been given, devoured not only the leaves but the root of that plant with such avidity as nearly to have terminated its existence in the south eastern provinces; while the *Cactus Tuna*, or awl thorned opuntia remained untouched by the insect." (Wilks iii, p. 89.)

Sir George WARR, in his Economic Dictionary, sums up the connection between the cochineal insect and the destruction of prickly pear by recalling the various points open to doubt but, at the same time, reminding the reader of the indubitable fact that in certain areas it has

proved a distinctly destructive agent. It is unfortunate that the Report of the Prickly Pear Commission of Queensland (1914) which contains much valuable matter on the various propositions for eradication of the plant could not be completed with an account of experiments with the cochineal insect as intended by the Commissioners, owing to the interruption following the late war. One point, however, is worth bearing in mind in respect to the stated fastidious habits of the two varieties of the insect above referred to—namely that they identify the prickly pear used for cultivation of the cochineal at Tenerife as the yellow-flowered *Opuntia dilemni*. In areas where this variety of the plant is predominant (e.g. Southern India) there should therefore be no hesitation in commencing the experiments the Queensland Commission desired but found it impossible to undertake. It is true that in the presence of aniline dyes the project could not be commercially of any importance, but it might well offer profit sufficient to render such an experiment cheaper than the manual labour now alone really competent to deal with the pest.

The Queensland Commission in their enquiry dealt with other points connected with possibilities of prickly pear than the cochineal industry. It has been suggested from time to time that it should be possible to secure alcohol from this source. So far as the plant is concerned they found that the sugar present was "small in amount," only 10 per cent. of its structure being carbohydrates, whilst starch is "practically absent." In Italy, the fruit has been used for a considerable period for the production of potable spirit, as it contains from 10 to 15 per cent. of sugar; but it takes no less than 110 lbs. of fruit to make 1 gallon of alcohol. Nor is the matter of quantity and consequent difficulty of cost of collection the only impediment; they state the yeast ordinarily associated with it is *Saccharomyces opuntiae*, which gives but imperfect fermentation, and that to secure satisfactory results it is necessary first to sterilize and then employ *Saccharomyces pastorianus*, which accomplishes complete conversion.

The suggestion has also been made that prickly pear could yield fibre for paper making; the results of enquiry by the Commission was to show that it possessed possibilities for coarse paper or the making of boxes. A mucilage is obtainable from warm water contact with the plant; the Commission asserts that in Northern India it is employed as an addition to whitewash, and in Southern India is mixed with lime ("chunam") used in forming polished chunam walls. Whilst not aware of its fulfilling these rôles, the writer has seen the mucilage used in Southern India with excellent results as a size when attempting the difficult task of painting Portland cement plaster, which has had insufficient time to mature.

Experiments have from time to time been conducted on using the prickly pear for cattle fodder, and at the present moment this is

* In certain of the West India Islands, during the late war, the fear of food shortage induced the increased cultivation of sweet potatoes and storage of amounts surplus to present requirements was contemplated by sun drying. In the presence of a demand for power alcohol there should be room for utilizing surplus production. According to the U.S. Department of Agriculture, Farmer Bulletin, No. 268 of 1906, the sweet potato contains 27 p.c. of fermentable matter—only fifth of which consists of sugar. In practice, it is found that a "bush weighing lbs. 55½ of which is fermentable, say, lbs. 14 should yield 1 gallon of 95 p.c. alcohol."

receiving attention in India. The writer has seen it used in famines with results which seemed to prove it might be a valuable adjunct to the fodder of animals—provided it could be made certain that all thorns could be excluded, which without some special arrangement would seem a matter of great difficulty. In its absence, in spite of ordinary care by manual work, animals die as a result of perforation of the intestinal tract by the thorns, which behave very much as needles when swallowed by human beings.

Whilst then the cochineal possibility must be regarded as still open for enquiry, the employment of the prickly pear for fibre and for mucilage has encouraging features; but the most important indication set forth by the Commission is as follows.—“All parts of the prickly pear including even the root system contains a relatively large amount of oxalate of lime in a crystalized condition, as well as other salts of oxalic acid in a dissolved state. There are grounds for believing the former could be readily isolated by mechanical means only.” They hold that if the decomposition were effected by sulphuric acid, prickly pear would form a richer source than sawdust now used.

Miscellaneous Publication, No. 1944 [1917, June 2] of the *Agricultural Gazette of New South Wales*, embodies a paper by Mr. W. W. FROGGATT—the Government Entomologist in which he discusses the utilization of insects for purposes of the destruction of the plant. After showing that although considerable damage may be effected by various insects without preventing the plant ultimately rallying, he makes the following suggestion:

“Noticing how destructive and fond the common introduced garden snail (*Helix aspersa*) is of cultivated garden cacti, the writer has suggested that experiments might be made by turning out into a prickly-pear area some large land snails. A very large African land snail (*Achatina fulica*), accidentally introduced into Ceylon, has increased and appeared in enormous numbers in one of the country districts.

“The fact that this snail would only have a choice of prickly-pear stems and gum-tree foliage would incline them to the more succulent cactus; and they would, while under the shelter of the cactus scrub, be quite happy, but unable to live in the open hot sunlight.”

TOXINS IN SOILS.*

In the animal economy failures to explain vague evil symptoms connected with metabolism are conveniently camouflaged as due to “toxins”—variety dubious. The upsetting of digestion conducted by nitrifying organisms in soil may also be attended by an accumulation of toxins which may be inimical to plant growth.

For example, it has been found that sudden water-logging of soil which has been treated with oil-cake results in semi-anaerobic conditions, with accompanying infertility; “this infertility did not occur to the same extent when ammonium sulphate was substituted for cake, nor did the effect of the water-logging become apparent until the roots of the plants had gone down some inches, to that level in the soil which oxidation consequent on the cultivation had failed to reach. . . . Laboratory work on nitrification and on the growth of seedlings in water and soil cultures demonstrated the possibility of separating substances from certain bacterial cultures, from decomposing organic matter and from anaerobically incubated soil whose toxicity to nitrifiers, and in greater concentration to seedling plants, was demonstrable under these conditions. Interesting

* Report of the Agricultural Research Institute, Pusa. 1915-16, p. 87.

observations were made as to the interference with the growth of seedlings resulting from the bacterial invasion of the unexhausted and still attached seed, and the consequent absorption by the plant of toxic bacterial by-products."

The presence of nitrites in soil was found to effect germination and early growth; this explained the apparently anomalous result of an experiment in which germination in a well aerated soil compared unfavourably with that in the same soil badly supplied with air; on further examination it was found that in this soil where a well aerated complete nitrification was preceded by the incomplete stage of nitrite formation and accumulation and as this was coincident with the germination period of the seeds sown therein the germination of the latter was interfered with to a greater extent than in the soil in which no nitrification was taking place. . . . Weekly borings and nitrate determinations throughout the year were made. . . . The nitrate accumulation was highest in February and reached a minimum in August; this was only in the first foot of soil and no doubt represented the vertical movement of nitrates parallel with that of the soil water."

At first sight, this incursion into the realms of Agriculture may seem to lack interest to the sanitarian, but there is little affecting the environment of man and beast that does not demand his earnest attention. With the results gained by agricultural research are bound up the possibilities of successful food production and absence of malaria in spite of irrigation, of disposal of waste products containing disease-bearing agents, and, in considering food deficiency diseases and their geographic distribution, of possible contributory causes in plant nutrition and soil composition (e.g., the readiness with which phosphates can be obtained from certain soils), and the varying composition of water. Of the last-named condition, it is evident from the researches under reference that were temporary water-logging of the soil to occur in the immediate neighbourhood of a well-yielding water of known and suitable chemical composition, nitrites might be detected, on a periodical analysis taking place, to an extent warranting suspicion of some recent contamination; whereas there would be merely represented the normal process of nitrification interrupted in completeness in the particular patch of neighbouring soil concerned, without any new increment of organic matter. Similarly, variations of salts with the season, which is faintly indicated so far by these preliminary researches, might well have a bearing upon TRENMANN'S cholera theory—discussed in this *Bulletin* at p. 17, Vol. 14, No. 1 (Sanitation Number), of July 15, 1919.

THE WATER HYACINTH.

In this *Bulletin* (Sanitation Number), Vol. 12, No. 1, p. 235, reference was made to a mutual pest of the Irrigation Engineer and the sanitarian, namely, the water hyacinth (*Eichornia crassipes*); the former finds it is indirectly capable of making breaches in canal banks, by obstructing water flow until increased height and weight of water behind attains a bursting pressure; the latter grudges the shelter afforded to his inveterate enemy—the mosquito. Burma has suffered greatly from the pest, and legislation was invoked against it. Section 6 of the Act referred to runs as follows:—

"Any person who (1) possesses or keeps the water hyacinth or (2) fails to destroy in accordance with the terms of the notice referred to in Section 5 any water hyacinth growing in any such place as aforesaid is guilty of an offence and shall be liable on conviction thereof to a fine not exceeding Rs.500."

After calling attention to this Act, the "Rangoon Gazette," in a recent issue, adds that when the Act first came in force "armies of coolies were employed in cleaning every tank either supervised by the D.P.W. or local authorities, but that the matter is now neglected with consequent re-growth of the plant. The moral obviously is that, as is the case in attempting extirpation of the anophelines, measures must be radical and, if mere palliation be attempted, efforts must be continuous. Having regard to the experiments of Mr. HOWARD, C.I.E., stated in the reference above quoted, it is evident the authorities concerned have not appreciated the fact that with Bengal within easy ship transport the hyacinth as a source of potash should present opportunity for recovery of expenditure in part or whole.

In view of the increasing difficulties connected with the pest, the Bengal Government, Revenue Dept. (Agriculture), has addressed a circular to all administrative officials and all Local Bodies urging prompt action for its eradication. The value of the plant as a potash producer, in accord with the experiments of Mr. HOWARD, C.I.E. of the Government of India Agricultural Dept., is duly acknowledged, but the cost of freight of the ash and the tendency to adulterate this, which has apparently been exhibited by "profiteers," are adverted to as possible drawbacks to the extensive utilization of the plant for this purpose. Meanwhile, the Circular declares that the weed

"can only be used economically therefore in the following ways:— (1) as a fertilizer; (2) in the form of ash as a fertilizer; (3) as fodder and (4) as fuel. On the other hand, though, according to the latest reports, an increasing quantity of the plant is being used by the people in certain areas as a fertilizer, and, in particular, as fodder for cattle and also as fuel, I am directed to remove any impression there may be that the above measures for the utilization of the weed are likely to result in the complete clearing out of the channels, water-courses and pools in Bengal or in preventing the insidious increase of a pest which it has taxed the energies and resources of other countries to eradicate. The Governor in Council desires to emphasize the fact that the danger from its growth is such that prompt extermination is the first consideration and that the question of its utilization where it can be done without fear of the plant being exploited and fostered for commercial gain, must give place to that of its complete extinction."

Food.

Putrefaction in Fish.

Experiments by Dr. Louis Gross, of the McGill University, Ottawa,* shows that during his investigations as to the causes contributing to the putrefaction of fish, he ascertained that "eviscerated fish in which the gills have not been taken out putrefy more rapidly than those in which the gills are removed." To identify the factors involved, Dr. Louis Gross placed specimens of "pollock and hake in a warm room; in one set of fish the gills were removed, in the others not—in both evisceration was carried out. In 48 hours there was a putrefactive odour from the fish—but more marked in fish in which the gills were left." When the gills were removed and exposed to air, they "showed no evidence of putrefaction."

* Report No. 6, Dominion of Canada, the Honorary Advisory Council for Scientific and Industrial Research.

An investigation in the method of eviscerating fish by the fishermen proved that viscera are carelessly removed by hand, the intestinal contents are smeared over the gills, the fish left for hours before the dealers receive them. It was apparent, "since every part of the fish was inoculated with similar bacteria, the earlier and more extensive putrefaction of the gills was due to the fact that the gills form an unusually good culture medium for the bacteria. Was it due to the fact that the bloodiness of the gills was conducive to more rapid growth?"

Having compared results of cultivation in various media, Dr. Gross came to the conclusion that "two bacteria showed a distinct preference for gill and blood media." His observations have led him to advise that "it is desirable to recommend the removal of the gills and a thorough washing of the eviscerated fish to prevent at least to some degree early putrefaction."

Parasites of Fresh Water Fishes.

From time to time, correspondents in lay papers relate the horrible "discovery" that certain fish are infested with worms, with the result that there is a slump in the local fish market and a popular scare. To meet this recurring condition, the U.S. Dept. of Commerce, Bulletin No. 42, Bureau of Fisheries, has recently dealt with the subject of parasites occurring in fresh water fishes. Prof. H. S. PRATT states,—

"None of the worms which parasitize fishes and other aquatic vertebrates in this country [America] will live in the human body or cause any infection there, and this is true whether the parasites occur in the viscera of the fish and would be removed when the fish is cleaned for cooking, or in the flesh in the form of cysts or grubs and thus remain in the fish after it has been brought to the table. The single exception to this statement is the European broad tapeworm, but this worm is of such very rare occurrence in America as to be practically negligible. There need be no alarm consequently about the possibility of an infection of parasitic worms as a result of eating the flesh of fishes, frogs, ducks or other aquatic animals."

[Owing to the prevalence of the *Dibothriocephalus latus* in certain European countries, it is usually in respect to fresh water fish that "scares" arise; but were the question confined to quantity and not to infectivity of man, the palm would probably go to marine fishes—at least in tropical waters]

Milk Production.

Experiments on the "influence of environment and breeding in increasing dairy production," at the Iowa College of Agriculture and Mechanic Arts has demonstrated the potency of thorough-bred sires, as against those of unselected breeding, in securing high milk production in their daughters. Thus, in the case of the five daughters of one high-bred bull, the milk production was on an average 5421.1 pounds with 276 pounds of fat, whilst their dams produced 4457 pounds of milk and 204.35 pounds of fat." When total feed cost of production included both the lactation and dry periods, it was found "that the three-quarters bloods give cheapest production and the half-bloods next, showing that grading up the herd through the use of pure bred sires not only gives increased production but also lowers the cost of production. Individuality however remains a factor

that must be counted with. In illustration of this, there is quoted the case of two hull sisters "After correcting the records for the influence of age, it was found that No. 180 produced 31 per cent. less milk and 25 per cent. less fat than did her scrub dam."

Polished Rice.

According to the Report of the Agricultural Research Institute, Pusa, for 1915-16 (p. 14), a comparison of the constituents of rice before and after polishing exhibits the following important changes. Three samples were analysed. In respect to influence of varieties of rice no research was made; although not "pure line cultures," the samples were all products of Government farms, where definite cultural conditions existed:—

"The composition of the rices did not vary much. The analytical figures allow an interesting deduction. The amounts of oil, fibre and ash vary between very narrow limits and the sum of these constituents will be more or less constant. The sum total of the remaining constituents of albuminoids and soluble carbohydrates is thus also constant. It was found that the sum of the percentage figures for albuminoids and soluble carbohydrates, in all instances except three, fell between 94 and 95. In these three latter cases the figures were 93.9 and 95.3. But the deviation is so small that the general observation may be said to hold good in these instances also. It was thus noted that when the amount of albuminoids was high the carbohydrates content was low and vice versa.

"The amount of phosphoric acid is always very slightly less than half of the total mineral matter present. Potash is, again, very nearly half of the amount of phosphoric acid present.

"*The effect of Polishing*—The composition of polished rice is dependent somewhat on that of the original unhusked rice. But although the amount of substance removed as bran is not very much, the grain suffers a material alteration in composition. The polished rice becomes poorer in all constituents except soluble carbohydrates which increase a little. The amount of oil decreases to less than half; the albuminoids suffer only a slight diminution; the fibre is reduced to about one fourth of the original quantity and the amount of mineral constituents falls to a half. The outer layer and the embryo which are removed during the polishing operation are thus seen to be richer than the inner material in all these constituents. But the concentrations of fibre and oil in the bran are relatively higher than that of the mineral constituents. The distribution of the albuminoids is more uniform than that of any of the above.

"It has been noted already that in the unpolished grain the quantity of phosphoric acid is just less than half of the ash. In the polished rice also, the phosphoric acid is slightly less than half of the amount of ash. The potash content, however, which in the unpolished rice is about half of that of the phosphoric acid now rises to about three fourth of the amount of phosphoric acid.

"It thus amounts to this that, although both phosphoric acid and potash are more concentrated in the 'bran' than in the rest of the seed, the distribution of the potash is more uniform than that of the phosphoric acid.

"As regards the material lost during the operation of polishing, this consists of the plant embryo and some of the outer layers of the grain. The germ being freely exposed and not embedded in the grain is easily rubbed off, the little nick at one end of the polished grain marking the place where it was located."

Lathyrism.

The connection between khesari dal (*Lathyrus sativus*) and the nerve symptoms classed under lathyrism has been long maintained. The Report of the Agricultural Research Institute, Pusa, for 1915-16

records that specimens were obtained from a village where the disease was notoriously prevalent, and that efforts were made to segregate an alkaloid. Although the existence of an alkaloid has been asserted by certain authorities, it was not found possible to recognize any. It was however ascertained that "kesari" samples are often contaminated with foreign seeds from which a cyanogenetic glucoside was isolated. It further records that some feeding experiments were conducted with guinea pigs, but the results attained are not stated.

Sugar Cane.

Dr. SCOTT, Government Bacteriologist, Jamaica, recently gave an account of an affection which he terms "central neuritis" amongst labourers employed in harvesting sugar cane, which apparently was consumed by them so as to bulk largely in the total diet. Without suggesting any necessary connection between the two facts, it is of interest to remember that Mr. Somers TAYLOR, of the Agricultural Dept. of the Government of India, has proved the presence in sugar cane of aconitic acid, "and has actually isolated the substance in small quantity. The conditions determining the formation have also been studied."

Food Dyes

Subject to certain rulings, the U.S. Dept. of Agriculture in "Food Inspection Decision," No. 180, of 1919, permits the use of the following dyes. The numbers affixed refer to A. G. Green's edition of the Schultz Julius systematic list of the organic colours, published 1904:—

Red shades, 107; Amaranth; 36, Ponceau, 3R; 517, Erythrosine. *Orange shade*, 85, Orange, 1; *Yellow shades*, 4, Naphthol yellow, S; 94 Tartrazine; Yellow A. B. (Benzeneazo- β -naphthylamine) Yellow D.B. (Ortho-Toluenazo- β -naphthylamine). *Green shade*, 435, light green S. F. yellowish. *Blue shade*, 692, Indigo disulfoacid.

Sudan I and butter yellow having been proved unsatisfactory are no longer included in the list of permissible dyes.

Ice Creams.

B. W. HAMMER and L. R. SANDERS,* as a result of a series of experiments on the subject of the purity of ice creams, give it as their opinion that whilst it is true the quality and not the quantity of bacteria present in the ingredients of ice cream must be the final test of its sanitary safety, the enumeration of bacteria possesses a distinct value when guarded by a sanitary survey of the surroundings of origin of material employed, and by measures to secure bacterial cleanliness of vessels used in the process of manufacture. They emphasise these views by stating:—

"While in most ice creams with high bacterial content *Bact. lactis acidii*, a harmless type, predominates, the entrance and rapid multiplication of these organisms occurs under conditions that make possible the entrance and multiplication of undesirable and possibly harmful types."

They found the bacterial content of cream ordinarily used varied from 81,500 to 24,700,000 per cc. Such cream obviously demanded

* Bulletin No. 186, March, 1919, The Iowa State College of Agriculture and Mechanic Arts.

pasteurization. The mixture of this cream with the other constituents intended for the making of the desired product brought about a decrease, on an average, of 13 per cent. of the bacterial content. This effect it was concluded was due to the plasmolyzing influence of the sugar which is added to it in manufacture. On the mixed cream and other constituents being subjected to pasteurization, a decrease ranging from 91.5 to 99.5 per cent. occurred. Under the influence of freezing, the lowest bacterial count in their experiments was 360 and the highest 81,000 per cc. They conclude that

"the results indicate that ice cream can be made by the method of pasteurizing and homogenizing the mix with a highly satisfactory bacterial count. When this mix was held for 21 or 48 hours below freezing, there was a higher count than when the mix was frozen at once. This was in all probability due to growth of the organisms during the holding."

*Annamite Condiments.**

Dr. Rosé, who is described as "Directeur du Laboratoire officiel pour la repression des fraudes" in Cochin China, gives an account of the condiments in general use in the French possessions in the Far East. At every Annamite meal a number of dishes are placed at the same time on the table; the staple is rice which is taken with the contents from one or other dish at every mouthful, and the whole is flavoured with "Nuoc-mam" the preparation and composition of which are here described. It is the result of the maceration of fish in a concentrated solution of sea salt, and resembles the product of tryptic digestion of albuminoids, or "a solution of pancreatic fish peptone." At least one part of salt is employed for three parts of fish. With less salt a different, inferior, product is obtained which contains more ammoniacal nitrogen and a much smaller proportion of amido acids, and it is these that give to Nuoc-mam its alimentary value. Putrefaction is therefore to be avoided. A good sample is recognized by the proportion which the amido acids bear to the ammoniacal nitrogen, as well as by the total content of organic nitrogen. The best Nuoc-mam contains in 100 parts nitrogen 42 of amido acids and 21 of ammoniacal nitrogen. Properly prepared Nuoc-mam keeps for at least a year.

Other condiments, of pasty consistency, are "Mam-tôm" in Cochin China and Annam, "Prâhoc" in Cambodia and "Padee" in Laos. Mam-tôm is shrimp paste, made from 12 parts of shrimps and one of salt. Its preparation takes a month and the older it is the more valuable it becomes. Analysis shows it to be Nuoc-mam in the form of paste, at a rather more advanced stage of fermentation or digestion.

Prâhoc differs little from Mam-tôm, but is made from fish and not shrimps. Padee again is similar, differing in the details of its preparation. The content in nitrogen of the three solid condiments is compared, with the proportion of organic nitrogen, nitrogen titratable with formal, ammoniacal nitrogen and amido acids. Like Nuoc-mam they are the products of the auto-digestion of the flesh of fish or shrimps by cellular ferments, the salt preventing to some extent microbial putrefaction. All four condiments, Dr. Rosé writes, are

*Rosé (Edmond) Le Nuoc-mam, condiment national indochinois.

BRÉMOND (H.) and Rosé (E). Condiments azotés solides en Indochine.

ROSÉ (E), Étude comparée de diverses sauces alimentaires. *Ann. de l'Inst. Pasteur*. 1919. Apl. Vol. 33. No. 4. pp. 275-281; 282-291; 292-300.

indispensable complements of the ration of rice-eating peoples. They are far superior to European sauces but have earned a bad reputation by reason of faulty methods of preparation and resulting putrefaction.

In the last paper the composition of Nuoc-mam is compared with that of a sauce designated M. No. 1 and a Soy sauce obtained from the bean *Soya hispida*, the conclusion being that from the point of view of chemical composition the three are interchangeable. They supply nitrogen in a less costly form than meat and are capable of replacing a proportion of the meat of a diet.

The analysis of two English sauces showed them to have no nutritive value.

[M^M. BREMOND and ROSÉ, in their interesting account of the condiments used by the Annamites, unfortunately give no clue as to the amount of the fish preparations ordinarily employed for dietetic purposes, and it is hence difficult to evaluate any contribution to the nitrogenous constituents of the food. Fish is evidently subjected to much the same manipulation in Annam as in Siam and Burma—the preparations differing in name and but little in character, variety being due to care as to selection of fish for the more valued preparations, which undergo pressure in jars or tubs in layers covered with salt, whilst the inferior may consist of merely the odds and ends of a day's fishing which is flung in the brine from which a superior brand has been removed. Nuoc-mam apparently corresponds with the Burmese *ngapi*, and mantom, which is stated to be prepared from shrimps, would correspond with *balachoung* made from prawn—a preparation not unknown on European tables. Writing in 1819, FENWICK after describing the method of preparation of *ngapi* in Burma states, "however carefully the stuff is made there must always be a considerable proportion of uncured flesh—flesh the salt cannot reach. This flesh decays and rots but the rest is properly cured flesh." In Siam, *ngapi* is known as *kapi*, and here the same tendency as traceable in M^M. Bremond and Rosé's account of Annam conditions is apparent, as stated by GRAHAM in his book "Siam." If the Siamese finds himself out of stock of *kapi*, he "will use rotten beans similar though somewhat inferior to *kapi* in taste, and falling very short of it in smell." A more dainty preparation than *kapi* used in Siam is known as *poh lemu*. This consists of fish which has undergone the usual process of packing and pressure in layers of salt, but "to each layer is added slices of lemon, pepper, etc. It is allowed to remain only 24 hours in the vats and is then spread on screens and dried."

In the process of preserving fish under pressure with salt, much oil rises to the surface of the scum. This is carefully collected in Burma and, in doses measured by spoons the size of a filbert, is distributed over the food as a flavouring delicacy.

In recognition of the national habit of using *ngapi* with food, the diet of convicts in Burma jails contains $\frac{1}{2}$ oz. per day, and this amount conforms reasonably with the customs of the free population. In the amounts utilized in that country at least, it would not seem (as held by M^M. Bremond and Rosé to be the case in Annam) that the total addition to the nitrogen of the diet would be of marked importance. In Burma jail dietary symptoms of fish poisoning do not accompany its employment, and it is credited with the possible initiation of digestive processes.]

SANITARY ORGANIZATION.

MINISTRIES OF HEALTH.

In accordance with the advice of a Royal Commission appointed to enquire into the sanitary state of the Army in India (1859), Sanitary Commissions were appointed for each Local Government in India, as permanent Bodies. With the Central Government of India however no appointment was made; so that the opportunity of a Federal Sanitary Service, or Ministry of Health, was missed. At the Indian Medical Congress of 1891, a proposal to this end was made by Prof. W. J. SIMPSON, C.M.G. So far as it had gone, however, the Royal Commission had made a great step in advance. Apparently, it had hoped to exercise influence of a federal nature through the Secretary of State, in an unpretentious manner, by the appointment of two or more Members in Great Britain of tropical experience, who were, on the one hand, placed in touch with the British Army authorities and, on the other, with the India Office. The Army Sanitary Commission was however in its opinions hopelessly in advance of lay appreciation of sanitation. In course of time, the Home Members after a struggling existence disappeared. The personnel of the Provincial Sanitary Commissions was steadily cut down; the pay of the remaining Members was diminished; and, finally, the Commission in each Province was represented by a solitary Sanitary Commissioner whose pay was in the first place diminished, and who, subsequently, underwent a decrease of both pay and rank.

In more recent times, Australia grasped and carried out the conception of a Ministry of Health; and, recently, Canada and Egypt have run Great Britain closely as to second place of honour in health organization.

Of the type of organization aimed at in Egypt, the chief points as advised by a Commission of which Lt.-Col. A. BALFOUR, C.B., was President, have been stated in this *Bulletin* (1919, July 15th, Vol. 14, No. 1, Sanitation Number, pp. 29-31).

The principles which underlie sanitary organization for central co-ordination of Provinces, possessed of Laws differing in accord with local conditions of advance or prejudice (consideration for which is essential for successful administration) are well exemplified in the outline of functions assumed under the Ministry of Health for Canada. From an abstract of the Act concerned provided by the "Engineering News-Record" (New York) of July 3rd, the following information is compiled:—

The nature of the technical staff is not defined, but the widest power is given by stating that it shall be such as may be "necessary for the proper conduct of the business of the Department." Business "is regarded as" all matters and questions relating to the promotion or preservation of the health of the people of Canada over which Parliament itself has jurisdiction." [The possession of this wide power is of course invaluable, but it assumes that the new Ministry of Health will in its appointments *correctly balance the influence of the various professions which now mould sanitary doctrines.* The initial step in this respect might give a tone to modes of procedure which might hamper advance

of the sanitary in favour of the curative branch of the profession for many years. A safer course would probably be to define the branches intended to deal with the various technicalities involved (which, in the light of publicity, would at the outset necessarily be the subject of criticism), and, after such definition, add the wide powers regulating the organization of the personnel, and thus ensure the keeping in touch with future advance of sanitary science.]

The further powers hestowed by the Act are: Co-operation and co-ordination of all health authorities for preserving and improving public health and promotion of child welfare; the establishment of a national laboratory for public health and research work; all sanitary matters connected with immigration, seamen and administration of Marine Hospitals; supervision of public buildings and care of civil and all other government employees; the enforcement of international regulations concerning health requirements; the administration of certain Acts defined in an attached schedule; the collection and publication of statistics. "Provision is made for a Dominion Council of Health to include the Deputy Minister of Health who is to be Chairman, also the chief executive officer of each Provincial Board of Health in the Dominion, together with not over five other persons to be appointed by the Governor in Council." Care is taken to preserve the independence, in so far presumably as the issue of bare orders is concerned, from the Ministry of Health of any "provincial or municipal board of health under the laws of any province" [Whilst therefore the Ministry will be responsible for the administration of certain Acts, co-ordination is probably aimed at being secured by power of requiring attention to these Acts, and for the rest by advice tendered under the cover of prestige afforded by the position of the Minister of the central government.]

PORTS AS SANITARY OUTPOSTS.

In a paper delivered at the Royal Sanitary Institute,* on the subject of "Obviation of Shipborne Infections," Dr. WILLOUGHBY, the Medical Officer of Health, Port of London Sanitary Authority, placed on record several practical considerations in dealing with plague infected ships. He does not adopt preventive inoculation amongst men removing cargo, but trusts to the fact that they are all acquainted with the nature of the work on which they are engaged, and states:—

"I presume this is a safeguard to the general public more potent than the notification of each worker to the Medical Officer of Health of his District, which is also made, because any worker taken ill would probably mention his particular circumstances of work to his medical attendant and put him on his guard as to diagnosis. Every worker is dressed in one garment overall, tied at the ankles and wrists against the possible attacks of fleas, and, on leaving work this garment is left on the ship. . . . The discharge of cargo is effected under the following control; cases and barrelled goods incapable of harbouring rats or nests to proceed to destination without hindrance. Bagged and baled goods to be stored in barges or in sheds allocated for a minimum period of fourteen days. All bales or bags capable of harbouring rats or nests to be scrutinized before delivery overside, and broken cases examined and recoopered on the ship. Lighters not to be allowed alongside during the night or after working hours."

* *Jl. of State Medicine* 1919 April.

In the matter of recognition of the plague bacillus, he warns against negative bacterioscopic results of examination:—

"There is an important point which has to be recognized in the scientific side of our dealing with plague ships and plague in general. However useful, interesting, and soul-gratifying in the completeness of its demonstrations bacteriology may be, and is, practice must be a day, perhaps many days, in advance of the bacteriological certainty. Clinical evidences are of necessity the guide to action. The plague bacillus, though not a very strict parasite, is sufficiently so to suggest that if clinical evidences are only met by a bacteriological negative, the difficulty and consequent failure are on the bacteriological side. The putrefying rat, and pus or fluid from the bubo of a self-immunized patient, are not material from which the plague bacillus can be readily obtained for demonstration though this may have recently swarmed in that which is submitted to the bacteriologist as being at the moment of decisive action the only available material."

At page 193 of the July issue of the Journal above quoted, Professor Hope, Medical Officer of Health for the City and Port of Liverpool, also discusses the sanitary importance of Ports. He concludes his address with the expression of opinion that the experience gained during the present war and the dawn of the new regime under the Ministry of Health will serve to bring into prominence the vast influence of efficient Sanitary Services attached to ports. He believes:—

"The work will be carried on at a higher level of efficiency, and many new phases of development will appear in the near future. The health administration of ports all over the world will be considered of first importance, not only in safeguarding the health of the nations, of which they are the first line of defence, but also from the international standpoint. There can be no doubt that international co-operation to prevent disease of all kinds will be more in evidence than in the past. Already international Conventions have arranged many matters in regard to plague and cholera. Why should such conventions not deal with smallpox, enteric fever, and other infections which are now endemic in certain regions of the world? Much good would result from a consideration of this subject."

In illustration of the work fulfilled at the present time by the Port of Liverpool he cites, irrespective of routine work against infectious diseases (those endemic to this country as well as those of foreign countries—including cholera, plague and yellow fever), the immense benefit secured by systematic inspection of imported foodstuffs, and holds that "no such complete and thorough system of inspection exists in any other country in the world." Under the Aliens Act of 1905, he states that "many persons have been rejected who were suffering from phthisis, venereal diseases and other dangerous complaints," but points to the weakness of the Act which defines an alien "as a steerage or third-class passenger"—seeing that rejected persons may return as saloon or second-class passengers. This is a form of legislation which has similarly proved itself ineffective in regard to vaccination of passengers landing at Rangoon. (This *Bulletin* (Sanitation Number), Vol. 14, No. 1, p. 35.) In connection with the importation of hides, he emphasizes the importance of measures against anthrax—a necessity which should appeal also to Port Health Officers in the tropics. To the credit of Liverpool in the person of a late representative citizen, Sir Alfred Jones, he places the pioneer effort towards improving the sanitary condition of the quarters of the Mercantile Marine, and the establishment of libraries on behalf of seamen. Presumably, as a result of his own initiative—although he

makes no claim thereto—Prof Hope points out that efforts to minimize the incidence of venereal diseases were undertaken in pre-war days, by the “boarding medical officers handing to sufferers pamphlets giving information and advice regarding the nature of these complaints, and indicating a suitable hospital at which the patient was advised to attend. Under the recent rulings of the Local Government Board, the scope of this idea has been extended by giving full information to crews generally, and employing posters in their quarters. Having regard to the considerable communication with the West African Coast the Liverpool Port Sanitary Authority have considered it advisable to issue instructions of a precautionary nature to the masters of vessels, advising prophylactic measures, and the administration of quinine before entering an infected port, whilst in that port, and for some days after leaving.

ROUTINE RECORDS.

In practice, it soon becomes obvious to the sanitarian that his work can be defined as a bacteriological experiment on a large scale; either he or the ever present microbe is to be in command of any given position, if a single lapse in the details of his procedure occur, an undesirable microbe may predominate to the confusion of his best laid scheme. Hence, early he learns not to regard the chief recognized mode of spread of disease as that which solely concerns him, but to remember that in the law of chances it may happen that the less frequently apparent modes of spread of disease may bring with them equally great mortality in the population, the single grain of seed may require only more time to produce as great a crop as a bushel. Hence in all preventive actions, the necessity for attention to details; the failure to close a single loophole may result in the entry of the enemy. Sanitary organization cannot stop with the providing of a skilled staff; that staff must be well disciplined and capable of grasping details. Of office work little is heard in any system of sanitary organization proposed, because, of necessity, each officer concerned must be allowed full freedom to evolve his own methods; but whether a single city be dealt with or a large Province, it is essential that possible factors in disease spread be sought for, and so placed on record that it shall be feasible at any moment, at least, to grasp the major distinctive peculiarities and sanitary history of any locality, in the interests of swift preventive measures. The following culled from p. 3 of the Administrative Report of the Public Health Dept., Colombo Municipality, 1918, affords a glimpse of methods desirable in the office of a Municipal Health Officer:—

“A detailed sanitary survey of tenement properties in the town, was made by Dr. Aserappa during the year, with a view of systematizing the work of improvement under the housing Ordinance. A register was opened for each ward, in which insanitary tenement properties are recorded street by street, the condition of each premises is noted, and the action taken is recorded. As a further guide to dealing with unsanitary dwellings, a record of Phthisis cases which had been notified during a period of 7 years, was compiled, and arranged by streets, the intention being to direct action first towards those localities where most cases of Phthisis had occurred, Phthisis being the chief of the diseases associated with structurally defective dwellings. 338 premises including 2,280 dwellings, were registered as structurally insanitary and plans were called for; the plans of 32

premises, comprising 198 dwellings, were considered, the improvements required were noted on them, and they were then referred to the Works Engineer for action under the Housing Ordinance. 20 dwellings unfit for habitation were closed under the plague Regulations, while 18 were demolished. 1,531 dwellings were disinfected, and 6,001 were cleansed and limewashed. 428 samples of milk were analysed, of which 68 or 16 per cent. proved to be adulterated. 23 samples of well waters were analysed, of which 14 proved to be dangerously polluted, 10 polluted or abandoned wells were filled up, while 7 cesspits were abolished."

WATER-SUPPLIES IN THE TROPICS.

The importance of Field Laboratories in securing prompt recognition of disease foci and disease agencies cannot be overrated. In so far as their applicability to water supplies is concerned, G. W. HEISER (formerly Chief of the Section of Water Analysis, Bureau of Science, Philippines) makes the following remarks in the "Engineering News Record" (New York) of the 30th Jan. :—

"Difficulties inherent in water examination are exaggerated in the tropics. Samples sent in for analysis are often taken improperly and are unaccompanied by necessary data concerning the source, while, owing to the climate and to difficulties of transportation, they rarely reach the central laboratory in proper condition for examination. European or American standards are of little value. The writer virtually abandoned nitrogen determinations in chemical water analysis. Colony counts on plain agar; presumptive and, if necessary, confirmatory tests for *B. coli* and a test for protozoa served for the routine biological examinations. The organism of dysentery is not readily detected, and the presence of amoebae in surface water is of little significance, as noted above.

For a field survey undertaken by the Bureau of Science a field laboratory was devised, patterned after that of the United States Geological Survey, with which it was possible to make both chemical and bacteriological examinations. Though lacking the refinements of laboratory analyses, the field examinations gave results superior to those usually obtained in the central laboratory, since field methods were sufficiently accurate for ordinary purposes; and as the analyst obtained his own sample he could make valuable observations regarding the nature of the source."

SANITARY RULINGS.

SLAUGHTERHOUSE REGULATION.

The City of Capetown¹ health authorities having experienced difficulty in working the existing rulings as to slaughter of cattle and the examination of meat, propose that amended requirements shall be as follows :—

" (a) No carcase or meat of animals not slaughtered at the Municipal Slaughter-houses shall, if intended for sale as food within the Municipality, be by any person taken to or by any person caused to be taken to or deposited in any place within the Municipality (other than a place of examination) until such carcasses or meat has been examined by an authorised official of the Council and stamped and passed by such official as being sound, free from disease and fit for food purposes. This Regulation shall not apply to game.

* * * * *

" (b) A place of examination shall be : (1) The Municipal slaughter-house. (2) A depot or depots provided by the Council for the purpose. (3) In the case of carcasses or meat consigned by rail or by sea, such suitable place as may be agreed upon by the Council with the consignee, or failing agreement, the place of discharge from the railway or ship.

" (c) For the examination and stamping of carcasses or butchers' meat so brought into the Municipality, the Council shall have the power to make the following charges :—For each ox carcase or part thereof 9d. For each sheep carcase or part thereof 2d. For each pig carcase or part thereof 6d. For each calf carcase or part thereof 6d.

" (d) No person shall deposit, keep, prepare, or expose for sale, or cause or suffer to be deposited, kept, prepared or exposed for sale any carcasses of meat or portions of carcasses of meat unless such carcasses or portions thereof have been stamped and passed by an authorised official of the Council as being sound, free from disease, wholesome and fit for food purposes. For the purposes of this regulation the onus of proof that such meat was not intended for sale shall rest with the person in possession or charge thereof.

* * * * *

" (e) No person shall use or cause or suffer to be used any imitation, counterfeit or fac-simile of the Council stamp or brand, or fix or impress any such imitation, counterfeit or fac-simile on any carcase of meat or any portion thereof intended for sale for food purposes so as to make it appear that such flesh has been examined, passed and stamped by an authorised official of the Council as being sound, free from disease, wholesome and fit for food purposes, and that an additional regulation providing for a penalty be inserted."

SOUTH AFRICAN PUBLIC HEALTH BILL.

The Report of the Department for Native Affairs (Union of South Africa) affords a summary of health conditions in South Africa during the period 1913-1918. It is stated that malaria was particularly persistent in the Northern Districts of the Transvaal, in 1915. Small-pox was kept well under control by vaccination. Syphilis was very prevalent in Northern Transvaal and Bechuanaland, which was infected by natives returning from labour centres; it was formerly rare in that area. Typhus was first noticed in the Eastern Province in 1916. Lice disinfecting stations were established under the

¹ The Corporation of the City of Capetown. Annual Report of the Medical Officer of Health for Year ended 30th June, 1918. Appendix p. xxxii. .

supervision of officers to whom any hardships involved could be stated. From "Spanish influenza, in 1918 about 80,000 natives died, and a Commission was appointed to make investigations on the subject." By means of District Medical Officers, aided by Hospital orderlies who had been trained by war service efforts were made to distribute medicines and inoculation was freely practised. Tuberculosis is especially in need of attention in towns and typhus in rural areas.

It is stated that the influenza "epidemic has stirred public attention to health matters and a draft Public Health Bill is under consideration.

... There is no doubt that many of the local authorities have neglected their duties in the past—treating Municipal locations as sources of revenue. Were it simply in the interest of labour in domestic service, in the Mines and in Agriculture, health reform is necessary." [In time of peace it is difficult to make a people comprehend that the State should be prepared for war, in the absence of epidemics, the fact that "prevention is better than cure" is also liable to be forgotten. It required an epidemic of cholera attended with 53,293 deaths, in 1848, to cause England to think of sanitary legislation and reform.]

LABOUR AND EUGENICS.

A new Labour Ordinance is under preparation in Ceylon to meet agitation there as to labour conditions. In this connection Mr. C. F. ANDREWS—an expert on Indian labour conditions—has recently made a tour of inspection of the various Tea Estates. Whilst admitting that in many of the Estates conditions are certainly susceptible of improvement, he makes the following remarks as to results on labour of eugenic environment:—

"He had nowhere seen anything better than the arrangement made for the accommodation of labour on some of the best Estates. Indeed it would be difficult to devise anything better. On one estate he had seen what he had never seen before. The Tamil cooly well-fed, well-dressed, clean and self-respecting. On this estate, the employer had spent money freely, had laid out a model village with model houses (Rs.550 had been spent on the house for one family) and garden allotments for his labour. Given these facilities, the Tamil labourer had taken full advantage of them, and had done the rest himself. The expenditure had undoubtedly repaid the employer amply, as his labour was thoroughly contented and could therefore be depended upon."

—* It has since been estimated by the Commission then appointed that the deaths of Europeans from influenza amounted to 11,726 and natives 127,000. U.S. Pub. Health Reports, June 20, 1919.

SANITARY WORKS.

SURFACE SULLAGE DRAINS.

There is probably no recognized form of sanitary engineering work which, in proportion to the financial outlay, gives such unsatisfactory results as open drains intended to deal with sullage; they are inherently unsanitary, but as a makeshift arrangement in small communities may have a *raison d'être*. In an Article in "Indian Engineering" (Calcutta) of the 2nd August, treating of such drains, no argument for or against the system is stated, but the difficulties which are likely to be encountered in their cleansing and maintenance are entered into in a useful and practical manner. It is pointed out that the labour requisite to keep open sullage drains free of silt is often a matter of financial importance, and that defective design and construction of drains especially at junctions are, in this connection, obvious factors. Thus, given a drain making junction by a direct drop to one on a lower level, there shortly occurs a deposit as the result of momentary cessation of current velocity, with attendant deposit of silt—at first small but shortly of appreciable size, a fortuitous flush may carry such a deposit for a certain distance down a drain—only to find a resting place which will permit of further accumulation of silt behind it. The writer of the article has found, in practice, that attention to the correct formation of junctions, often without any flushing, has resulted in a remarkable difference in a drain as to silt accumulation. He insists that this care as to junctions is requisite however small they may happen to be, or "however small is the incoming drain. No drain is so small as not to matter."

Whilst not doubting that flushing fulfils a useful function, the article warns against the belief that this will suffice to get over difficulties of imperfect gradients or faulty construction. He enumerates the various means usually employed as follows:—

"(a) ground hydrants, (b) hand pumps working from wells direct into the drains, (c) flushing tanks with automatic syphons operated with spill water from wells or stand posts, (d) the same with the spill water augmented with or replaced by pumped water, (e) flushing tanks using the same water as (c) or (d) but released by a hand-operated plug and (f) tipping buckets.

"At one time much was expected of (c) and (d) because it was thought that the spill water would make the automatic flushes go off frequently. But experiments have shown that flushing tanks do very little good, except on gradients sufficient to produce and maintain a velocity of about 3 feet per second. On flatter gradients, the force of even a large flush is very rapidly dissipated and the amount of spill water proved far less than was anticipated, in many cases being insufficient to produce a flush even once a day. That being the case, the expense of the syphon seemed to be scarcely justified and it was thought that a hand-operated plug to be opened by the drain cleansers when required, would be more suitable. But it then appeared that in the latter case the coolies were likely to swamp their work and did not fill the tank full before discharging it, whereas in the former, it was only by filling it that the syphon could be made to work, and the flush discharged.

"Experiments have been, and still are, in progress to determine the relative efficiency of the different flushing methods. It has already been abundantly proved that in most towns in the plains, no system of flushing will keep surface drains clean without manual labour. There is also considerable evidence that a small steady stream of water gives more

assistance to the sweepers than sudden heavy flushes. Such a stream can best be given from ground hydrants where piped water is available, or from wells by means of small pumps where no water works exist. The ideal system is to admit a stream of water at the summit of each drain and then at intervals down the drains, the water being turned on at the hydrant or pump next above the point at which the sweepers are working. Obviously so many hydrants or wells as this involves can rarely be given, on account of expense, and the best sites available must be selected.

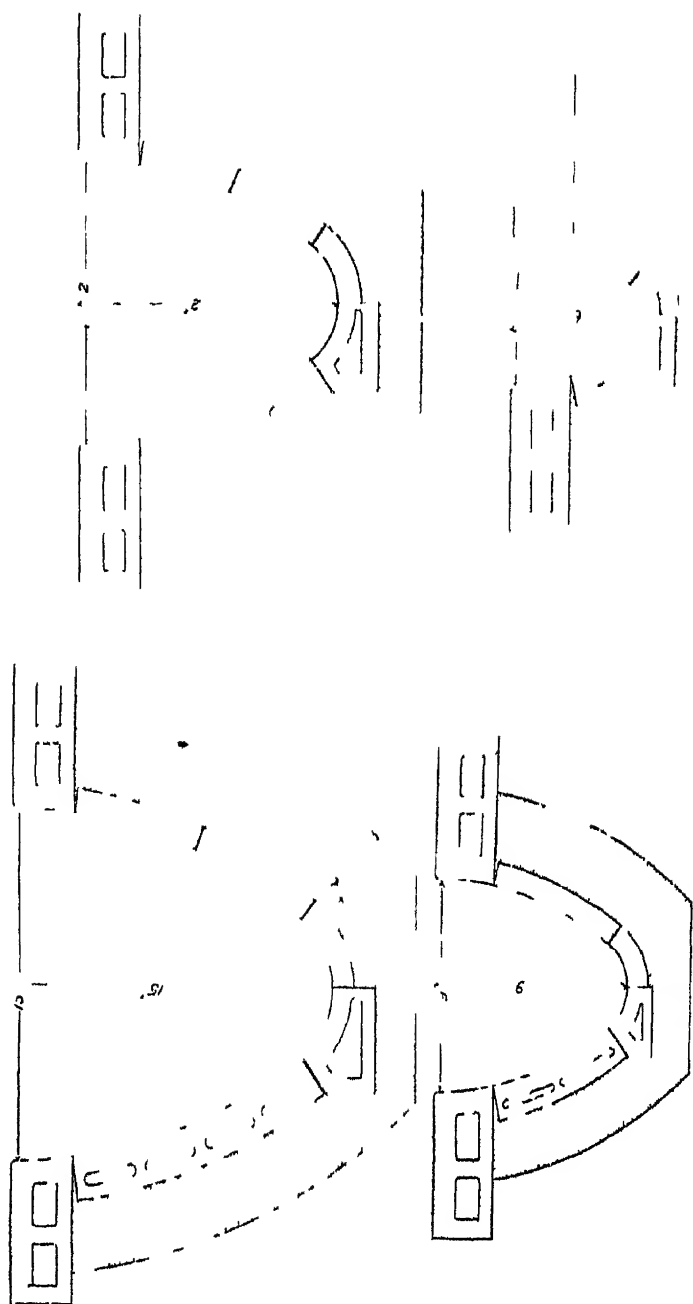
... "Mr. G. A. Ostler, District Engineer, Champaran, on the Motihari drainage system . . . installed a Gould's Rotary Lift and Force pump on a platform in a well at the highest point in the town, from which by means of a hose pipe water can be poured into any one of four drains. He found that he could clean in 2½ hours a drain 2,650 feet long from its summit to the final outfall with two coolies on the pumps and two sweepers on the drain. . . . Approximately 950 gallons of water is required per 1,000 feet of drain.

"If a well can be found near the summits of three or four different drains, and from which the water can be led into any one of the drains at will, it is worth while to instal a fixed pump. Where a well can only serve one drain, a portable pump is desirable. . . . In Motihari, the manual fire engine was used for drain flushing, being moved round to different wells in turn. This ensured that it was kept in working order and that there were men trained to its use. . . . In some cases additional wells are required.

There remains yet another source of trouble, namely defective maintenance. Whenever the inner surface of a drain is damaged, the resulting roughness tends to catch silt, and produce the same consequences as a defective junction. Mufassil municipalities are usually very reluctant to spend sufficient money on drain repairs, and rarely, if ever, have any methodical arrangements for providing funds for repairs as they become necessary."

[To the useful methods of drain flushing mentioned above may be added the use of Norton's tube wells at the head and in the course of drains, at intervals, in cases—which are in certain areas only too frequent—where the subsoil water level is permanently and suitably high. This arrangement would imply that the pumps are under lock and key except at the hands of the drain cleaners, otherwise their life would not be long. In referring to the formation of junctions, the article specifies the difficulty of making even the superior grade of workmen adhere to the necessary change of form and suggests the use of graded templates. But it is not only during construction that templates may be useful. When fitted to the respective sizes of drains, it is possible to use them for making temporary dams in the course of drain and, after detaining the water within certain lengths, allowing the mass to pass as a flush. Worked systematically so that cleansing of the drain by brooms can proceed simultaneously, fair results can be secured on poor gradients.

But, irrespective of lack of skilful grading at junctions, workmen dealing with great lengths of open sullage drains rarely do their work sufficiently well to avoid irregularities of size of the drain, in spite of careful supervision, when plastering with cement; yet if the velocity of the sullage is to be reasonably uniform, notwithstanding its frequent varying contents, a smooth surface and uniform area as calculated in the plans of the special work must be maintained. Further, as pointed out by the article, where Municipal bodies fail to appreciate the fact that a broken surface in a drain must be promptly repaired, each abrasion of surface left unattended to must result in the adhesion of silt.



Open Sullage Drains to be made in Salt Glazed Stoneware; all one eighth full -12", N.B.—All bottom inverts would be made in one piece, only half elevation for section, s shown.

To possess a drain, therefore, which does not depend upon the care of the workman forming it (as in the case of drains made of concrete, brick, stones, etc., faced with cement) and can be replaced in parts accurately at a moment's notice, and which of itself is made of material which shall present a smooth and easily cleansed surface, would be a desideratum. This has been attempted by using half-drains salt glazed for the inverts of sullage drains, and constructing above this level on the spot with the ordinary materials named. But the ovoid form of invert which is essential in dealing with drains where the contents vary so greatly diurnally, is not usually procurable from manufacturers and, in any case, it would be infinitely better to make the whole drain of one material. Holding these views the writer, in 1889, secured from Messrs Jennings, Poole, Dorset, the plans as per diagram attached. These drain tiles are light and are readily transportable, and offer advantages in parts of the tropics where transport is, and where skilled labour is *not*, easily procured.]

MAKESHIFT DRAINAGE.

The pioneers of sanitation in the tropics have not always at command railways that will bring them such simple yet all-powerful adjuncts of applied hygiene as the sub-soil drains, nor even indigenous labour sufficiently skilled to form them. Hence the possibility of using material, however crude, found on the spot may at times prove of decided advantage, when inaugurating anti-malarial measures. From the makeshift methods of our forefathers at a period when the importance of drainage to agriculture was beginning to make itself felt, useful information may be gathered. According to a book entitled "The Duty of a Steward to his Lord" published in 1727, the following methods were pursued:—

In the West of England, the land to be drained was first ploughed two feet deep; the excavation thus formed was then completed by digging to a depth of four feet—care being taken to render the trench "wider at the top than the bottom." The trench was then filled with the green brushwood of black thorns, withies, white thorns, etc.; on this were laid flat stones, so as to keep the brushwood together and make it tight; the trench was then filled up with "the material dug out of it."

The following curious method is quoted *verbatim*. A Mr. Switzer is credited with having excogitated it:—

This consists of "draining by artificial tubes or trunks of clay, which, he saith, hath proved one of the most useful inventions that has been found out in any age and will do in pasture arable or wood lands, provided you work deep enough. . . . Be provided then (saith he) of three or four narrow spades about eight wide and fifteen inches long with a handle put into a socket and ring with a tread round it to set the foot upon to dig; and at every twenty foot asunder, if the ground lie near a level dig a narrow trench of about ten inches, or a foot wide at most quite though at twenty foot asunder, and a full foot and a half within the clay; then take a wooden rowl of about five inches diameter at one end of four feet long and four inches diameter at the other, and placing this rowl at the bottom of the trench take the clay you had before dug out and with a rammer ram it round the rowl which will form a perfect tube, and the rowl being bigger at one end than the other you may by the help of a chain fastened to the

* By Edward LAWRENCE, Land Surveyor. Printed by John Shuckburgh at the Sun between the two Temple Gates, Fleet St.

bigger end put it out of the tube ; so that proceeding four foot at a time you go through your trenches from end to end taking care to keep the extremities of the tube open. He saith there should be a handle about four foot long mortis'd into the great end of the rowl by which the workmen shoggle about the rowl so as to loosen it in the tube by which means the rowl will be easier drawn out by the chain. But before that is done you are to punch a hole about three inches diameter through the rammd clay upon the top of the rowl, through which perforation all the water is to pass that comes from the ground above down into the underground drain or tube below ; but still to keep the perforated hole open small artificial faggots of green wood should be laid upon it with a broad tile at the top to secure it from any impression that may come from above ; and thus (saith he) you have a clayey field as hollow and unfit to retain stagnated water as a sieve. These tubes he has known perform their office for twelve years even in plough'd lands when the disorder of horses might be supposed to spoil the whole scheme. It costs about twenty shillings an acre each drain at about twenty foot distance."

[From neither of these methods could there be expected permanent efficacy—but as "makeshifts" they certainly have merits. In the second system described, if the rammed clay tubes be really continuous (which is improbable) little action could be expected beyond receipt of surface water by means of the punched holes, notwithstanding the guarding tile over the entrance. It might be of utility where a depression in the ground level could at a suitable gradient be afforded an outlet, say, by cutting through a slight ridge—thus saving the cost of filling the depression. In any case, the unlined punched holes would receive water penetrating through the upper stratum of soil to a limited extent, and thus afford some further relief. In the tropics, having regard to the vitality of some "green woods," the pioneer who adopts the "makeshift" would have to take care that the "artificial faggots of green wood" did not result in a plantation of trees.

When "silting" is discussed, it is customary to appeal to examples of effective reclamation by the Italians ; the author of the book referred to however, in advising this mode accompanied by drainage for the recovery of certain swamps, states that "the improvement of land by floating with muddy water is now [1727] pretty well understood and frequently practised"—proving that Great Britain also employed this system. Not only so but he shows that by arrangement of sluices commanding drains from a swamp they can be caused alternately to convey the muddy water for deposit and receive for discharge the cleared water.]

ANTI-MALARIA WORKS IN CYPRUS.

In 1899, Col. Sir Ronald Ross attempted to give Freetown (Sierra Leone) the benefit of anti-malaria measures born of his then recent research—but the local Municipality still has the matter "under consideration" in one or other of the phases requisite ; and malaria is not only still there but a very fine entomological collection, referred to in a preceding Note,* shows that the ineffective progress of anti-mosquito measures bespeaks also yellow fever possibilities. In contrast both as to time and grade of effort is the example of Cyprus, which was visited by him in 1913. Work it is true had been attempted before his arrival, but following his inspection and Report these

* Mosquitoes of Freetown

efforts were multiplied and systematized. It is so rarely that British local authorities have followed advice in such fulness by sanitary officers as will ensure the removal of Malaria under modern methods, (if Malaya under Malcolm WATSON be excepted) that it is gratifying to find the small Island of Cyprus has made a notable departure from the rôle of apathy. The Chief Medical Officer, Cyprus (Dr. R. A. CLEVELAND) in his Annual Medical Report for 1917, shows that between 1912 and 1913 the annual total of malaria cases treated has declined as follows.—10,035; 7,342, 6,622; 4,539, 3,752, 2,709. During the period 1913 to 1917, the annual total average spleen rate was 17·2; 15·3; 11·5, 7·6; 6·0. In 1916, the total examinations for the spleen rate was 33,903 and, in 1917, 35,160. During the year 1917, the total expenditure on anti-malarial measures was £2,700. For this outlay 729,414 ft. of drains, and streams were cleaned and improved, 58,138 small and 11,977 large drains were made, 90 wells were filled in, 52 screened or covered and 372 stocked with gold fish; pools of a cubic capacity of 60,290 were either drained or filled in, and 54,331 square feet of grass were cut and removed. Seeing that two small bridges and two culverts were built, a marsh drained, a number of pools at different villages pumped dry, and drains, aqueducts, bridges, tunnelling, etc., repaired, whilst of the 1,750 donouns of reclaimed lands "about 500 have been cultivated, that the remaining part will in course of time be brought under cultivation (the portion remaining uncultivable being used as grazing land)," and that the cost named included drugs, salaries, etc., there is left remarkably little ground for persons who, admitting anti-malaria measures are not without success, refrain from taking action on financial grounds. Indeed, with such a list of work to credit upon so small a sum, the reader of Dr. Cleveland's Report will understand the regret with which he announces the death of the energetic Engineer Officer upon whom lay the burden of construction work—"The Department sustained a serious loss by the death of Mr. W. GILES, Sanitary Engineer, from typhoid fever, on 6th Sept. 1917. The success of the malarial work in the island is due in great measure to the work of this young, energetic and capable officer."

FINANCE AND MALARIA.

There is no lack of illustration of the fact that the introduction of irrigation in a tract of country, unless it be accompanied in its methods by care as to removal of the water surplus to the requirements of plant life, permits a grave risk of creating a focus of malaria. Nor is it solely in respect to failure of removal of water wittingly offered to the agriculturist that danger arises; faulty design of the canal employed, or the passing through or over soil readily permeable may result in seepage, which may declare itself at distances far removed from point of origin. In such cases, pools of doubtful origin may declare themselves and offer by steady oozing splendid opportunities for breeding of anopheles. The moral of course is that the Engineer who designs an irrigation scheme and the agriculturist who elects to use the water, respectively, should not only be required by strict legislation, and record by plans, to show how it is intended to get the water on to the land but also how it can be safely conducted off it.

In a Report published in the *Journal of the American Medical Association* (quoted by "Engineering News-Record" of July 21st, 1919) of May 24th, 1919, Dr. GRAY discusses the question of financial loss due to malaria prevalence estimated to have been sustained by the inhabitants of a tract of land of 32,000 acres in the neighbourhood of the Sacramento River. Both mosquitoes and malaria underwent a marked increase on the introduction of irrigation; in many places, mosquitoes so multiplied as to "make life nearly unendurable." Dr. Gray visited practically every family in the area and obtained full data as to actual cost of sickness, loss of labour and economic loss generally, with the object of ascertaining how far it would be possible to make the financial items so recorded form an offset against the cost of proposed radical remedial measures. The result of his enquiry was as follows —

"Drainage and mosquito-control work is estimated to cost \$22,400 in the first year, \$5,000 in the second year and then \$3,800 annually. Of the first year's expense, \$12,000 is allowed for agricultural drainage and correction of interference with natural drainage which would be required regardless of malaria. Estimating a reduction in malaria of 50%, 75%, 90%, and 95% for the first four years, this work should eliminate, in savings, the malaria cost due to medicine, medical service and labor loss, while it should show a considerable profit in other items, particularly in appreciation of property values. Dr. Gray states that experience in California shows that the above reduction percentages are readily obtainable. The organization of a mosquito-abatement district, under the California law, has been advised as the first step in measures for control of malaria."

SMALL WATER-WORKS.

It happily falls within the functions of the Sanitary Engineer and not of the sanitarian to advise that such and such a make of engines or pumps should be employed—provided the latter be satisfied that the mode of action of the type selected does not imperil sanitary requirements. But this by no means relieves the sanitarian of the necessity when proposing a water-supply scheme of taking cognizance of the various methods applicable, and, approximately of their respective costs. At all times, it would be his effort to avoid the recurring costs of a pumping scheme; but when this is inevitable, the difference between his proposals being accepted or rejected may be determined on the contention that pumping costs are out of the financial power of the community concerned. Hence the reputed efficiency and economy of types of pumping machinery must be held in mind when launching suggestions. The "Engineering News-Record (New York)," Aug. 28th, 1919, conveys much information on essential points with special references to small waterworks. Extracts conveying the chief arguments of the Article are as follows:—

"*Water Power*—The early use of power for pumping water in the small-town installations was largely by water power or steam, and it is possible that water power is coming back into use for pumping purposes, but probably through the medium of the hydro-electric plants, as it is not common to find good water privileges so located as to be directly available for pumping from the approved sources of water-supply.

"*Steam Pumps*—Steam has been used for many years very efficiently in many small plants.

"*Steam Turbines*—The development of the centrifugal pump, which has now found so wide a field was closely identified with the bringing out of the steam turbine.

THE IDEAL SMALL PUMPING PLANT.

The centrifugal pump has been known for a great many years but for a long time after it was invented the difficulty of getting suitable drive with sufficiently high speed retarded the development of successful operation of this type of pump. The real growth of this pump has occurred in the past ten years during which time the use of the steam turbine and the electric motor with direct connection to the centrifugal pump has brought up the efficiency of the pump to a relatively high stage. At the present time the use of the steam turbine as applied to pumping water is mainly in the large units, and the motor is generally adopted for driving the smaller plants.

The result of the use of steam is, on the whole, satisfactory, but for the small water plants it is subject to the objections that the economical pumping machines with boilers are expensive and occupy much space, and provision for large storage of coal and adequate pumping station buildings are required, all of which conditions add to the first cost of the plant and are aggravated by the fact that licensed engineers are required to operate such a station.

To-day we consider the ideal small pumping engine that which is economical in first cost, and is self contained; i.e., operates from a source of power which is part of the engine or at least located in the same station. It is desirable to have it occupy as small space as is practicable, be simple in operation and not require the services of licensed men, easily repaired, quickly started, using fuel which is readily available at all times, and be capable of producing power at a relatively low unit cost.

"Electric Motor" Many of the conditions of an ideal plant are met by the electric motor. . . . The advantages are: Low first cost; it requires little space; low cost of maintenance; no expert supervision; it is especially well adapted to drive centrifugal pumps with direct connection, which saves friction loss of gears, and prevents noise; it may have automatic control; it may operate during periods of low load at central station, thereby getting lower rates; instant starting, as it has no reciprocating parts, it can be left to operate without attendance better than any other form of drive. The use of electricity has two serious defects in the average municipal plant; namely, it is not self contained, but depends upon a line of wires and a power plant, usually at a distance, for its operation.

* * * * *

"The advocates of the use of motors base their claims of low cost of operation upon the fact that attendance may be a minimum and that this is really the large item in operating small water plants.

* * * * *

"Gasoline [Petrol] Engine." . . . It is operated upon a fuel of such high cost as to make the operation per horsepower-hour too high for practical purposes in the ordinary municipal water-works. However, in plants where an emergency unit is wanted and electricity is not available or desirable for any reason, the gasoline engine may meet the requirements in a satisfactory manner.

"Producer Gas" The gas producer as a source of power corresponds to the boiler in a steam plant. It has a great many advantages and when combined with a proper engine for utilizing the gas to the best advantage may be considered as having most of the requirements of the ideal plant. . . . The plant takes up more room than some of the other types, and calls for a larger pumping-station space.

"Fuel-Oil Engines"—In the writer's experience, in nine cases out of ten fuel-oil engines have proved an ideal installation for plants from 25 to 150 hp., and for this reason it may be proper to give some extra details regarding this engine. The term 'fuel oil' is here used to mean any oil, from the heavier crude petroleum up to kerosene.

"Fuel-oil engines are to-day known under two general heads as Diesel and Semi-Diesel, or surface ignition. . . .

"The *Semi-Diesel*, or surface-ignition engine . . . gets its power by the explosion of a mixture of air and oil gas in the cylinder under compression

around 200 to 300 lb. per square inch. While part of the energy is undoubtedly used in the shock against the metal of the plunger and cylinder the resulting thrust produces motion of the piston, which is connected through the crosshead, or directly to a crank shaft which gives the motion to the driving pulley or gear.

The Semi-Diesel seems to meet all the ordinary requirements of the ideal engine described above, and while the first cost of this engine is considerably greater than that of the gasoline engine or the electric motor, the operating costs are so low that this outweighs in most cases the advantages of the low first cost of the other machines.

In the types which are considered as small pumping outfits, designed to pump the water for communities of from 1,000 to 10,000 inhabitants the engines required ranged from 25 to 150 hp., but in the writer's opinion there is a large field for a still larger oil engine, and there are some machines now being produced that show wonderful efficiency in operation. They are of the Semi-Diesel type but are able to operate on the poorest grade of fuel oil, and even tar products which have to be heated before it is possible to get them into the cylinders.

The ordinary time of starting with fuel oil is from 12 to 18 min., but engines of this type may be equipped with apparatus which permits of instant starting by electric ignition and gasoline, the fuel oil being turned on after a few minutes, without interruption of the operation of the engine.

ELECTRIC MOTOR *versus* OIL ENGINES.

It is claimed by the advocates of the electric motor, in comparison, that the motor requires little attendance, while the oil engine calls for constant supervision. This claim is not entirely substantiated in practice, for many of the oil plants are operating for long periods of time without attendance. This of course assumes that there are duplicate units which will take care of any fire hazard if repairs are necessary. It should also be considered that constant attendance does not eliminate many of the breakdowns. Perhaps the most satisfactory combination that can be installed for a small pumping plant for general municipal needs is made up of two duplicate units, of which it is probable that the fuel-oil engine meets the needs fully as well as any other drive which has been developed up to this time.

One advantage, of considerable importance in some cases that steam machines have over most of the other types is in the varying of speed in operation."

ACTIVATED SLUDGE.

According to the Report of the Health Officer (Dr. STANLEY) the Shanghai Municipal Council has accepted the recommendation of Professor Gilbert J. FOWLER, D.Sc., to employ the activated-sludge method of sewage purification. The Health Officer makes the following remarks on the subject:—

"As Professor Fowler's scheme is incomparably better for safe disposal of water-closet sewage than the use of 'septic tanks' in connection with individual water-closet installations, and as the expenditure involved, though great, seems not more than so progressive and important community can bear, it was considered expedient to definitely prohibit 'septic tanks' although Prof. Fowler considered they might be used under certain conditions. But now that a separate sewage system with purification works is considered the best for local conditions by the sewage expert, and also by the local public health administrations, it seems better that effort be concentrated solely on the best plan without distraction along less efficient alternatives."

[In judging of the expenditure necessary for a scheme of this description, much depends upon the source of power for the air blast, this is not indicated by Dr. Stanley. Putting aside any question of special microbic methods of activating (and comparing incidentally small things to large) a fair instance of how nitrification can be markedly aided by air blast in disposal of small quantities of sewage, will be found exemplified in Fig. B of this *Bulletin* (Sanitation Number) Nov. 30th 1911, as described at page 459. In the opinion of the writer, the results were remarkably good.]

VITAL STATISTICS

INFANTILE DEATH RATE (CAPE TOWN)

During 1917-1918, in Capetown, the infantile death rate per 1,000 births was for Europeans 79.33, and for non-Europeans 201.16. In giving these results, Dr. A. Jasper ANDERSON, the Medical Officer of Health to the Corporation (Annual Report for the year ended 30th June, 1918) makes the following remarks (Appendix No. 8 p. xi).—

“From this table it can be calculated that amongst the Europeans 17.95 per cent of deaths occurred in the first week, and 31.28 in the first month of life of the total European deaths under one year. For the population termed ‘other than European’ the percentages of the deaths under one year were 15.62 for the deaths under one week and 28.22 for those under one month.”

As they stand the figures would imply that either by inherent weakness, or comparative lack of care, the European child has less chance of survival during the first month after birth than in the case of the non-European, and this in the face of the fact that for the year the mortality amongst the latter is very heavy—201.16 against 79.33 in the former. In 1916-1917, the respective rates were 226.76 and 96.20. The numbers of births on which these rates are reckoned are not strictly comparable, but they suffice to show that some truth of interest in infantile eugenics lurks behind them, in 1916-1917 the total births of Europeans was 2,122 and for non-Europeans 3,550, whilst in 1917-1918 the total births of Europeans was 2,158 and for non-Europeans 3,629.

A possible explanation might be that amongst non Europeans registration of deaths during the first month is poorly executed, and that the deaths per first month and per annum for this class is really greater than ascertained. That there may be some truth in this hypothesis is shown by a statement made by the Health Officer in another connection—the working of the Infant Life Bureau (p. xxviii, Appendix No. 8):

“As I stated in my last Report, it is most essential that it should be made compulsory to notify the Medical Officer of Health of all births within three days of their occurrence, so that such visits should be made promptly and not as at present when the child is several months old, or in some cases not at all because the child has died previously, which perhaps a little advice might have prevented.”

INFLUENZA MORTALITY.

The analysis of statistics bearing on the influenza pandemic of 1918 by Surgeon W. H. Frost (*Jl. Amer. Med. Assoc.*, 1919, Aug. 2, pp. 313-318 and *U.S. Public Health Reports* Aug. 15th, 1919, p. 1823), shows that the United States lost in the civil population 450,000 or at the rate of 4 per mille from this cause. In eight localities affording an aggregate population of 112,958, the following were the chief results secured :—

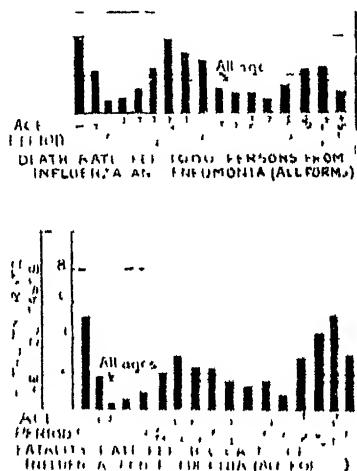
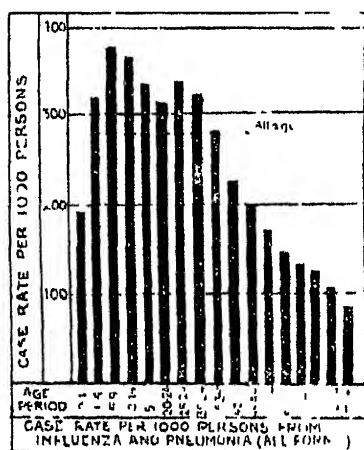
“The percentage of the population attacked varied from 15 per cent. in Louisville to 53.3 per cent. in San Antonio, Texas, the aggregate for the whole group being about 28 per cent. This agrees with scattered observations in the first phase of the 1889-90 epidemic, when the attack rate seems to have varied within about these limits.

‘The case incidence was found to be uniformly highest in children from 5 to 14 years old, and progressively lower in each higher age group. It

was slightly higher in females than in males of corresponding age, usually higher in the white than the colored population.

The ratio of pneumonia cases to total population varied from 5.3 cases per 1,000 in Spartanburg, S.C., to 24.6 per 1,000 in the smaller towns of Maryland. The pneumonia rate showed little correlation with the influenza attack rate.

The ratio of deaths to population varied from 1.9 per 1,000 in Spartanburg to 6.8 in Maryland towns. The death rate was by no means parallel to the influenza attack rate, but was correlated closely with the pneumonia rate. In other words, the case fatality of pneumonia tended to be fairly constant, around 30 per cent. except in San Antonio, where it was only 18.5 per cent. The death rate was notably high in children under one year old, in adults from 20 to 40 and in persons over 60; higher in males than in females of comparable ages; higher in the white than in the coloured.



INFLUENZA, 1918.

Case rates, death rates, and fatality rates among persons of different ages in certain areas surveyed in Maryland, San Antonio, San Francisco, New London, Louisville, Little Rock, Spartanburg, and Quantico.

[Reproduced by permission from *Public Health Rept.* 1919, Aug. 15.]

"The case fatality was likewise higher in these age groups under one year, 20 to 40, and over 60 years; and it is this fact rather than the incidence rates, which determines the death rates in different age groups.

"The accompanying chart A shows the attack rates, death rates and case fatality rates in various age groups."

In Nigeria, in the Northern Province, from influenza there were, in the general population, 199,325 deaths and, in the Southern Province, 255,000 up to the end of 1918.

In a Report published in the *Bulletin de l'Office International d'Hygiène Publique* of May, 1919 (pp. 471-490), the estimated deaths from influenza during 1918 in British India, up to Nov. 30, amounted to 4,983,182 or 20.7 per mille of the Census population of 1911 (238,527,635). Whilst 20.7 per mille represents the deaths in the total population of India, the following very high rates obtained in certain of the Provinces:—Ajmere—Merwara, 66.6; Central Provinces and Berar, 56.6; Delhi, 55.6; Bombay, 45.9, North Western Frontier, 40.0.

The following quotation from the "Madras Mail" affords an idea of the extent of ravages made by influenza in the Punjab —

"The appalling ravages of Influenza in India last year are thrown into sinister relief in the annual report of the Sanitary Commissioner of the Punjab. The death-rate for 1918 was 81 per 1,000 compared with an average of about 33. The death-rate exceeded the birth-rate by nearly 41½ per 1,000, and one district in the province lost nearly one-eighth of its population. Not only was the epidemic responsible for actual mortality, the birth rate fell considerably during the year, and there is no doubt that influenza was the prime cause, as it proved peculiarly fatal to young women during the last three months of the year."

INFLUENZA RACE INCIDENCE.

Amongst British troops in India, the influenza attack rate per mille during the 1918 epidemic was 218·2, with an accompanying mortality of 8·96 and for pneumonia 0·65, in Indian troops, the attack rate was 135·6, with a mortality of 15·21 and for pneumonia 6·48.

The case mortality in these figures would tend to show a less resistance to the disease in Indians than in Europeans. In South Africa figures quoted by Surgeon W. H. FROST and SYDENSTRICKER from the Report of the Influenza Epidemic Commission (Union of South Africa), 1919, show that here also race differentiation existed. Thus the total population of the Union is 6,115,212, of which 1,418,060 are Europeans and the remainder is classed as "Other than Europeans." Between Aug. 1st and Nov. 30th, 1918, there occurred 11,726 deaths of Europeans and 127,745 of "other than Europeans." The influenza attack rate in the former was 32·06 and the death rate 25·7; in the latter, the attack rate was 460·3 and the death rate 59.

REVIEWS.

DAS (Jahar Lal) [L.M.S. (Cal. Univ.)]. **A Manual of Conservancy.** (With an Introduction by Chas. A. BENTLEY, M.B. (Edm.), D.P.H., D.T.M. & H. (Camb.), Sanitary Commissioner for Bengal.)—xix + 189 pp. With 11 text figs. 1919. Calcutta: Butterworth & Co (India), Ltd. [Price Rs.5 10.]

In India, there are still to be found Members of Local Bodies who when taxed with neglect of the A B C of sanitation might soul conservancy will invite the attention of the sanitarian faddist to the fact that the all-powerful sun may be trusted to kill stray pathogenic germs, that the deposit in the open of material possessed of agricultural value is not without merit, whilst pigs and buffaloes are capable of dealing with the aesthetic side of the question. Indeed, a few years back the writer has known the economic side of the question valiantly defended at a Meeting of a Public Body responsible for sanitary conditions in seven thousand square miles: the opinion advanced was that, if the entrances to latrines were so obstructed as to prevent the inroad of buffaloes, the milk supply of the area concerned would be threatened. Such arguments can be readily met; but if the sanitarian is to gain his point in practice he must be prepared, at least, to give some idea of the cost of any scheme for conservancy he would advocate. If he can arrive at the quantity of material to be dealt with, and ascertain distances to be served and the nature of transport and labour possible of adoption in the area concerned, the preparation of a scheme of a simple nature on recognized lines should be quickly accomplished. But to furnish data of this character, in any detail, there has been a blank in available literature. Text books on sanitary matters by Indian authors have at times been open to the criticism that whilst it is evident that much study has been undertaken of methods applicable to European life, the peculiarities of Indian populations and their environment to which recognized axioms must be adapted are given no prominence; yet these are subjects on which Indian authors should be most helpful in aiding general sanitary advance. Mr. Lal Das has recognized the void by issue of a book of 182 pages on conservancy.

That much of the author's estimate of requirements is the result of first-hand experience in dealing practically with conservancy, is sufficiently shown by his description of the difficulties to be contended with in dealing with menial staffs. He has found it necessary to warn his readers of the characteristics of the *mekher*—the pivot-man of sanitation in India. In introducing this agency to his readers, he points to the meaning of the word "*mekher*" (a chief) as showing the popular tendency to keep the good side of this valuable servant.*

The author's description of characteristics is apparently equally applicable to "sweepers" or rubbish collectors. He states: "As these people very often give false names and addresses, it is always better to take their finger impressions in the admission register. . . . They are clannish, very difficult to manage and will absent themselves from work on the slightest pretext, such as a shower of rain early in the morning or a marriage among their friends. . . . [They] are apt to strike with insufficient cause or notice. . . . The *mekher* staff requires to be carefully watched, as they very often succumb to the temptation of emptying their pails in the nearest jungle or ditch instead of carrying them to the trenching ground." Under such circumstances, it is not surprising to find the author proceeds to define the qualifications of a good Conservancy Officer, by stating: "He must, in short, be honest, punctual, dutiful, fearless and impartial."

In course of time the *mekher* will doubtless be so educated as to be out of touch with his present duties. Whilst in the North of India the horrible equivalent (*mekher*) of "chief" is given to this functionary, in the South, a more resounding title is employed: here, when an impersonal call for the pivot-man is made, the title given is "*Maharajah*" (or super king).

These qualities he would rightly demand of the Sanitary Inspector; but the writer cannot accept the dictum that these qualities should be diverted to "conservancy work" as being "one of the principal duties" of that functionary. It might be applicable to small communities, but the desirable organization is the formation of a conservancy staff under a literate subordinate (Conservancy Inspector) responsible to the Sanitary Inspector of each area concerned, through the Health Officer. To place the Sanitary Inspector in a position in which he must sacrifice time and technical knowledge essential for disease discovery and prevention, in favour of attention to routine details requiring chiefly a sanitary conscience and a sense of duty, is to frustrate his *raison d'être*.

The author's estimate of carts and animals required for removal of rubbish is undesirably incomplete. He apparently does not contemplate the use of two-bullock carts under any circumstances. He allows 5 or 6 miles (an unnecessarily small limit) including stoppages for the collection of rubbish as the amount of duty expected of a single bullock with cart per day, and he believes that "this under ordinary circumstances means two to three trips." His standard is thus fixed without relation to the varying loads to rubbish depots in towns, the ascertained full capability of bullock power in traction of loads per cart (weight of vehicle unstated) of a capacity of 30 ft., which, according to him, implies a weight of rubbish of 8 to 10 cwt. A formula such as that excoagitated, as a result of taking all such necessary data into account, some years back by Mr. JONES, formerly Sanitary Engineer for the Government of Madras, which is in common use, would be more appropriate. Again, the usual estimate of faeces for the Indian male adult being 14 to 16 oz., the author adopts the extreme figure, and allows only 25 per cent. deduction for populations of mixed ages against 30 to 35 per cent. ordinarily estimated. He thus arrives at 12 oz. per head per day, plus urine and ablution water—a result which would considerably affect public expenditure. Where separate collection is undertaken, he suggests no way of disposal except cartage of the urine and ablution water obviously an expensive last resort. In his estimate for night-soil transport, the error is committed of assuming that a cart capable of conveying a certain number of gallons of water weighing the equivalent of the solid excreta of a certain number of persons would, in cubic capacity, correspond to the measurement of faeces indicated. In advising as to public latrines, he requires for each latrine having 12 to 15 seats two night soil carts; and would place each latrine in charge of a mehter or sweeper "provided with quarters near by"—an arrangement that ordinary organization and co-ordination should render more economical.

In calculating the necessary number of seats in public latrines per 1,000 "estimated users," he allows 8 minutes per head in the morning, between 4 and 8 a.m., and arrives at the conclusion that 35 seats would be necessary. A safer way would be to confine the estimate to the maximum within two hours in the morning—a matter which will doubtless differ with local habits; but, in practice, it will be found that the number of seats cannot be correctly estimated without due regard to the size of the receiving pails, combined with some attention to labour available and the therefore rapidity of change of pails.

Mr. Das exhibits more exactitude in treatment of night-soil by SILK'S septic tank latrines, as improved by Col. CLEMENSIA, I.M.S., and Dr. FOWLER. He also advocates this principle for private latrines, in what is known as the "Aqua" latrine, as invented by Mr. GURFFIN—the prototype of which has been for some time past in use in America. His confidence in the extent of disappearance of pathogenic agencies in connection with the overflow of this private latrine, because "the effluent fluid is so small that it can be allowed to soak away into the ground round about" should be supported by bacteriological data before it can safely be accepted. The aerobic latrine, which is largely and successfully in use in Burma, receives no notice by the author. The book concludes with information as to diet and diseases commonly met with in animals used for conservancy transport purposes; this section should prove useful not only to District Boards and Municipalities in regard to finance details of administration, but also to conservancy staffs in enabling them to maintain the efficiency of service.

Whilst in the interest of economy of the scanty funds usually available for sanitary services, the details above alluded to would bear closer scrutiny by the author, there can be no doubt Mr. Das has produced a volume of a useful character, which will aid the evolution of Applied Hygiene in the vast areas of India where the theoretical aspects of the Science hitherto have been more in evidence than its practice at the hands of many Local Bodies.

W. G. K.

McVAIL (John C.) [M.D., LL.D.]. **Half a Century of Small-Pox and Vaccination.** (Being the Milroy Lectures delivered before the Royal College of Physicians of London on March 13th, 18th, and 20th, 1919.) viii + 87 pp. 1919. Edinburgh: Livingstone, E & S. [Price 5s. 6d. net.]

The writings of a universally recognized expert ordinarily contain little pabulum to feed criticism; an instance of this is found in the recently published book by Dr. John C. McVail. To abandon the rôle of critic and to find as page after page is turned a pleasure in their perusal is a natural result, in the presence of remarkably concise and lucidly expressed arguments on a subject of vast sanitary interest, in which Dr. McVail has distinguished himself by life-long labours. Statistics of small-pox prevalence from 1867 to the present time in Great Britain and on the Continent are systematically marshalled; the proportions of the various populations attacked are considered, with due regard to incidence upon age and classes and to death rates; the influence of environment on disease spread is then entered into. With such matters carefully analysed, it then becomes possible for the author to enter into the question of comparative virulence of epidemics in different periods. Fluctuations in fatality having been dealt with, he demonstrates the existence of small pox types and discusses their position in epidemiology. The various modes of small pox prevention are then considered, and this naturally leads to a scrutiny of data concerning the value of vaccination. Here he wastes no space in contraverting the extraordinary theories evolved by lay antivaccinists, but states he deals solely with such opinion as may be formed by members of the medical profession. Thereupon is afforded the spectacle of a bout between the author and Dr. MILLARD, conducted by both in accord with the best dictates of professional ethics. Metaphorically, they shake hands in token of no ill will and then proceed not to kill but each to render his adversary's protective armour useless. Instead of availing himself of the wide circulation (which his book will doubtless secure) to "get in" a knock-out blow without possibility of quick reply by his opponent, Dr. McVail has taken the precaution of including a full statement of his views by Dr. MILLARD himself, as set forth in the *British Medical Journal* (April 19, 1919).

The author proves that between 1867 and 1916 epidemic prevalence of small-pox has decreased, but, having regard to the existence of types varying from mild to virulent, he leaves it open to the future to decide whether small-pox has *permanently declined* in infectivity.*

Dr. MILLARD utilizes the opening he believes to be thus afforded, and quotes the figures as to epidemics in support of his theory that the disease has so altered in its characteristics that infantile vaccination need no longer be a requirement aided by legislation.

*In the opinion of the writer, in the matter of spread of epidemics from the Continent, and particularly as to the threat of the North African type of the disease through France, Dr. McVail takes insufficient note of improved vaccination in that country since 1870-73. So long as our neighbours protect their people by vaccination we are in a better position than in that period; but conditions affecting traffic are undergoing changes as to rapidity which may yet imperil the country by importation of the disease from more favourable points for nurture of severe types of small-pox. For instance (as urged recently by Lt.-Col. GERRARD, I.M.S., in reference to cholera) the aeroplane is a factor to be reckoned with.

In Leicester in his function as Health Officer, Dr MILLARD is necessarily the leading authority in health matters. The responsibility as to vaccination being so largely in abeyance in that city however sits upon him lightly; as he does not contend vaccination is not protective of life, or constitutes a procedure in itself dangerous to human life.

The foundation of Dr MILLARD's doctrine is as follows: -

"To the public at large infantile vaccination is on balance disadvantageous, because it often makes subsequent small-pox so mild as to be unrecognizable, with consequent spread of infection by missed cases." Put in other words, Dr Millard holds that vaccination—an operation in itself so mild, that new born infants are successfully submitted to it and which is indubitably of great lifesaving value—may be withheld from infants in the interests of the community (though obviously in disregard of the safety of life) so that when attacked with small-pox its members shall exhibit such typical eruptions that medical men shall have a minimum of trouble in making a diagnosis—and this in the presence, *quantum valet*, of the allergic test lately added to medical armament. Dr. MILLARD defends his position by reference to the trustworthiness of the so-called "Leicester method" of combating small-pox. This, as Dr. McVail shows, has been whittled down from its original exemplification of theories that are "greatly daring," till it implies nothing more than trusting to a first protective line of prompt discovery of cases and their segregation, and the effecting of a damaged retreat under the protection of vaccination. In neither mode of defence, however is there any novelty; Dr MILLARD simply reverses the order of orthodox procedure to the belittlement of vaccination. The only merit Leicester can reasonably claim is the advocacy of a more strict search for eruptive fevers than the existing poor organisation of the subordinate sanitary staffs in certain towns in Great Britain yet permits. In a Report written by Dr MILLARD concerning the Leicester epidemic of 1902-3, he records 731 cases of small pox as having occurred in that City. In referring to this awkward incident, in his communication to the *British Medical Journal* above quoted, he demands admiration for the striking results of the Leicester method, thus: "The figures given in Dr. McVail's first Lecture will show how favourably Leicester compares with most other large towns." But this rough method of comparison is unsuited for attempting the solution of so serious a problem as dealing with the lives of the infant population of the country. To secure a reasonably safe comparison, numerous factors as to the movement of populations and the environment of the towns concerned would require consideration. But if Dr. MILLARD's statement be judged by the simple process of ascertaining the incidence of small-pox upon the respective populations, the honours would certainly not rest with Leicester.

W. G. K.

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The bracketed initial letters after the pages indicate the subject.

A	signifies Amoebiasis and Amoebic
	Dysentery
B.	„ Beriberi
Bl.	„ Blackwater
B.R.	„ Book Review
C.	„ Cholera
D.	„ Dysentery (Bacillary and
	Unclassed)
E.	„ Enteric Fevers
F.	„ Fevers
G.	„ Miscellaneous (General)
H.	„ Helminthiasis
H.S.	„ Heat Stroke
K	„ Kala Azar

L	signifies Leprosy
M.	„ Malaria
P.	„ Pellagra
Pl.	„ Plague
Pr.	„ Protozoology
R.	„ Relapsing Fever
S.	„ Skin Diseases
Sp.	„ Sprue
S.S.	„ Sleeping Sickness
T.	„ Tuberculosis
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